ROADS and STRUCTURES

HIGHWAYS • BRIDGES • AIR FIELDS • HEAVY CONSTRUCTION

Gillette Publishing Co., 32 West Maple St.
Chicago 10, Illinois

MARCH 1955

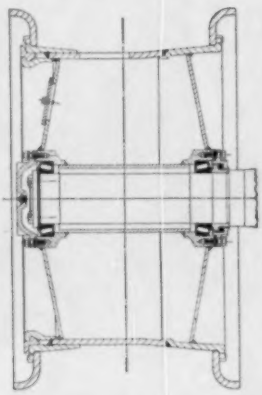
UNIVERSITY MICROFILMS
EUGENE B. POWER RG
313 N. 1ST ST.
ANN ARBOR, MICH.
COMP-LRY-11-50

On-and-Off Road Bottom Dumps

Borings for Soils Data

A score of methods articles in this issue — see contents page 4

Acceptance Authorized Under Sec. 34.64 P. L. & R.



How **INTERNATIONAL HARVESTER** mounts the wheels of its B170A scraper on Timken bearings to insure dependability, long life. The International Harvester TD-24 tractor also uses Timken bearings on the main drive sprockets.

Cuts 10 in. deep, carries 16 yard loads

TIMKEN® bearings keep it wheeling

CARRYING 16 yard loads, and often through conditions of heavy dust and dirt, the wheels of this International Harvester B170A scraper presented a neat design problem. How to keep out the dirt that would soon ruin any bearings under this load and yet take the heavy shock loads?

The solution: Timken® tapered roller bearings. Their precision keeps axle and wheel hub concentric and helps to provide maximum closure efficiency. Their tapered design lets them take any combination of radial and thrust loads, preventing side motion of wheels. These features work together to make the closures more effective, keep dirt from getting in, and keep the grease from getting out.

Timken bearings have exceptional capacity, since the load is carried on a *line* of contact between race and roller. They can take the shocks of rutted, bumpy ground, too; rollers and races are case-hardened, to give a hard, wear-resisting surface over a tough, shock-resisting core.

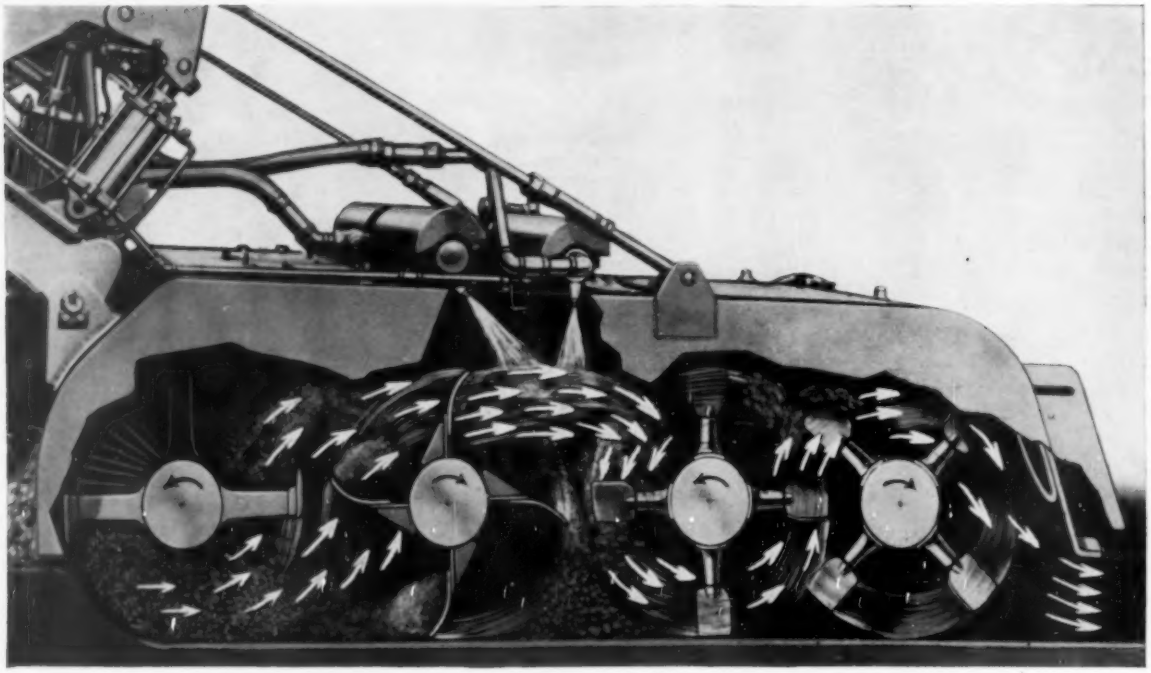
Because no bearing can be better than its steel, we make the steel for Timken bearings ourselves. It's the only way we can be sure it will be good enough.

For the least friction, the least maintenance, and—in terms of performance—the least cost, always specify the bearings with the trade-mark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭

BEARING TAKES RADIAL ↓ AND THRUST →○← LOADS OR ANY COMBINATION →⊕←



How P&H makes Soil Stabilization an exact science

Getting uniform high quality is a matter of fact with the P&H Soil Stabilizer — *not* guesswork. Exact results can be *predetermined* every time.

Here, in the P&H mixing box, *all* stabilizing functions are performed, not just some of them. Follow its full processing action. Note how atomized liquid is applied while materials are *in transit* between the blending drum and pugmill. This more efficient dispersion assures accurate, uniform coating of materials . . . ready for the twin pugmill to whip into a homogeneous mass for final spreading and immediate compaction.

P&H Model EA-56 is easily transported from job to job and processes a 5-ft. width.

Larger P&H Soil Stabilizers for processing 8- and 10-ft. widths for all road and base course requirements.

Compare specifications!

Insist upon having all specifications before you decide on the stabilization method. Know exactly what you can get in quality, uniform strength, speed and low cost and the many other advantages of the P&H method of processing. Then you will be convinced that the P&H Soil Stabilizer is your wisest choice. No other gives you so much production with so little allied equipment and skilled help. *And all this in just one pass!*

P&H SOIL STABILIZER DIVISION

HARNISCHFEGER CORPORATION

Milwaukee 46, Wisconsin

Ask for the complete story on this modern, lower cost and better method for building all-weather surfaces and base courses for roads, streets, airports, parking areas, etc., of soil-cement, soil-bituminous, or clay-gravel.

the P&H *Line*

. . . for more details circle 195, page 16

Beth-Cu-Loy galvanized pipe carries Delaware-Raritan Canal for 800 ft while retaining wall is built in the bed. *General Contractor:* F. A. Canuso & Sons, Philadelphia. Pipe was fabricated by Penn Metal Corporation of Pennsylvania, Philadelphia.

They had to "can" the canal without stopping its flow

Rolling leisurely through that corrugated steel pipe is the Delaware-Raritan Canal, near Trenton, N. J. It's in there because the contractor had to build an 800-ft highway retaining wall in the canal bed, and his contract stipulated that the flow of water remain uninterrupted.

They accomplished this in a rather ingenious way. First, they fabricated a 78-inch pipe of Beth-Cu-Loy galvanized steel culvert sheets, in sections 20 ft long. They submerged these sections and divers coupled them under water. Earth dams were then thrown across each end of the 800-ft stretch, and the water was pumped out between the dams. With the canal thus "canned," construction crews had a dry bed to work on. Once the wall was completed, the dams were removed, the pipe recovered, and the canal reverted to normal.

This unusual application proved a natural for Beth-Cu-Loy culvert sheets. The Beth-Cu-Loy pipe was easy to couple, even underwater. Its light weight made installation easier and faster. And its rugged strength was a lifesaver on this job where, for economy reasons, Beth-Cu-Loy had to be used in 12-gage under conditions normally calling for a heavier gage.

While Bethlehem does not fabricate Beth-Cu-Loy culvert or drainage *pipe*, we do manufacture the Beth-Cu-Loy galvanized corrugated or flat steel stock used by fabricators. Any Bethlehem sales office will furnish detailed information on Beth-Cu-Loy, including the names of fabricators who use it.

One end of project, with earth dam and pipe in place. Pipe did remarkable job under heavier-than-normal pressure.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETH-CU-LOY *GALVANIZED* CULVERT SHEETS

. . . for more details circle 167, page 16

ROADS AND STREETS

Sixty-Three Years of Editorial Leadership

Devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations; the construction and maintenance of airports. Represents 63 years of continuous publishing in the highway field; combined with Engineering & Contracting and Good Roads Magazines, established in 1892.

MARCH, 1955 • VOL. 98 • NO. 3

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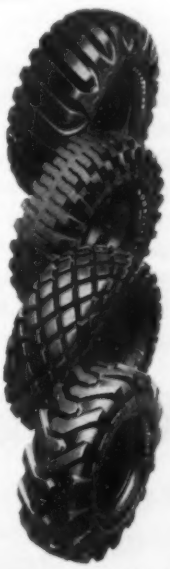
OLD EARTH-MOVING HANDS JOIN HARD-ROCK MEN TO MAKE "UNPROFITABLE" IRON MINE PAY OFF!

The Benson Mines, at Star Lake, deep in New York's Adirondacks, have been worked since pre-Revolutionary days—but working the low-grade, non-magnetic ore by old-time methods wouldn't pay today. Now a 30-unit fleet of 22-cubic-yard trucks, rolling on Goodyear tires, moves mountains to lay the ore body bare. 4-ton drop-balls, with old tires as shock absorbers (as shown above), break blasted rock to crusher size—and ingenious spiral troughs find "pay dirt" by the ton!

Besides stripping overburden of earth, trees and brush, earth-moving hands have endless road-building work—an earmark of open-pit mining.

3-T NYLON, world's most durable tire cord, keeps jobs rolling on Goodyears—

3-T NYLON, made only by Goodyear's *patented* process, can take terrific punishment. Users say bruise-breaks are practically unknown and tire-growth is permanently controlled. 3-T NYLON is also so *heat-resistant* that users say ply-separation, flex-failures and heat-blowouts are virtually eliminated! Combined with Goodyear's new, tougher rubber compounds, 3-T NYLON makes Goodyear tires the toughest, most durable—and saves you plenty with more re-lugs and recaps. Check into this before buying or specifying *any* new tire. Goodyear, Truck Tire Dept., Akron 16, Ohio.



HARD ROCK LUG

ROAD LUG

ALL-WEATHER

SURE-GRIP

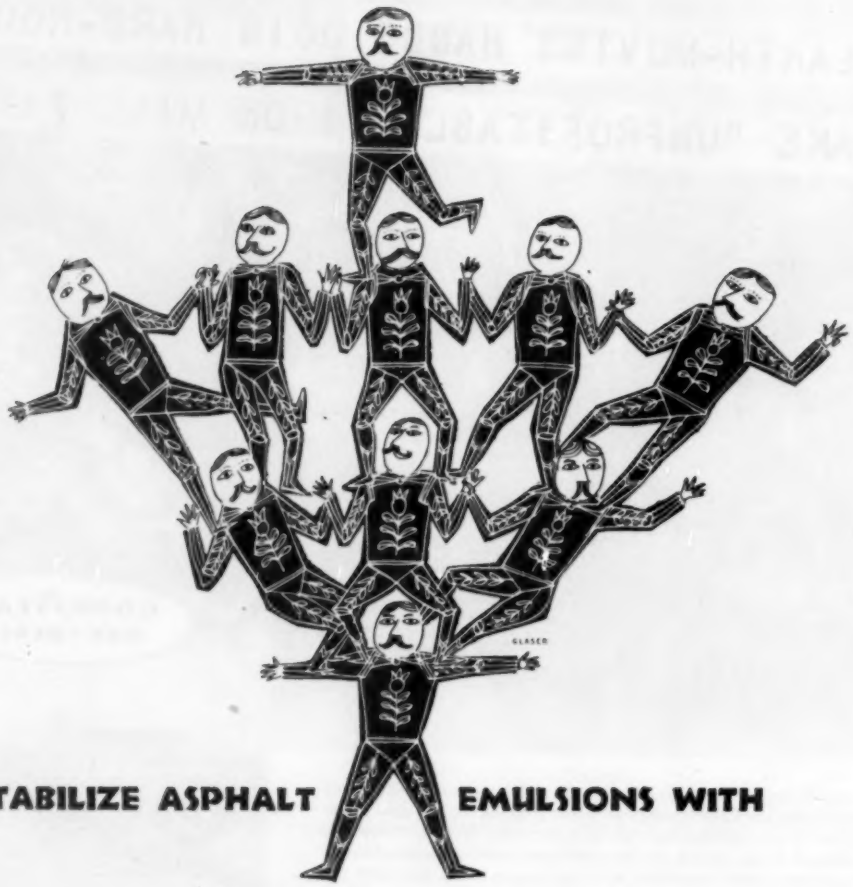
FOR EACH JOB, THERE'S A COST-CUTTING GOODYEAR TIRE BUILT WITH 3-T NYLON CORD!

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

. . . for more details circle 193, page 16

Road Lug, All-Weather, Sure-Grip—T. M.'s
The Goodyear Tire & Rubber Company, Akron, Ohio



STABILIZE ASPHALT EMULSIONS WITH

INDULIN

When you want a slow-break asphalt emulsion for mixing with aggregate, the addition of a stabilizer becomes imperative.

In this role, INDULIN C, a soluble pine wood lignin, is physically and chemically compatible with the asphalt emulsifiers most often used — the rosin acid soaps. And it is adaptable — works with asphalts from any petroleum source — with aggregates from all parts of the country. The ratio of stabilizer to emulsifier varies with the asphalts employed, but usually INDULIN C is included at a low 0.6 to 1.5% of the total formulation. This stabilizer is in itself stable — to deterioration on storage or standing — and to temperature extremes. It won't lump under moist conditions. It has a low ash content.

For an all-purpose, reliable stabilizing agent, use INDULIN C in your asphalt paving emulsions. Our laboratory staff offers complete assistance on formulation. Send for Bulletin 101B.

West Virginia Pulp and Paper Company

Polychemicals
DIVISION
CHARLESTON A, SOUTH CAROLINA

. . . for more details circle 248, page 16

HOW TO DO 4 JOBS WITH 1 MACHINE

Here's a borrow pit a half-mile from the water works in Kansas City, Missouri. 80,000 yards of fill are being hauled from it, to be placed around the water works' settling tanks. A housing project will go onto the leveled area.

Doing four jobs at once in this pit is a CAT* Diesel No. 112 Motor Grader.

It scarifies constantly – since the dirt in the pit is hard clay. It push-loads a No. 15 Scraper. It keeps the borrow pit clean. And it grades the area as the job moves along.

Working with the No. 112 for Miller Brothers Construction Co., Kansas City, are two DW10 Tractors with No. 15 Scrapers, and a D7 Tractor with bulldozer.

"In the eight years we've been operating," W. F. Miller says, "we've found our Cats to be our most durable and rugged machines."

One reason – in the case of the No. 112 – is this: built and serviced *entirely* by one organization, the Cat Motor Grader is carefully balanced, *power* with *weight* with *speed*. Its engine, controls, and frame and circle assembly are all designed specifically to work with one another. This integral engineering—with matched components—helps give you that durability and ruggedness Mr. Miller is talking about.

There are other reasons, of course, and your Caterpillar Dealer will be glad to discuss them with you. Better still, ask him to demonstrate. That's really the best way to size up this big yellow machine.

And remember, your Caterpillar Dealer is always ready with prompt, genuine parts service, too.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks – ®

99% OF ALL CAT MOTOR GRADERS EVER BUILT ARE STILL IN USE

. . . for more details circle 174, page 16

★When It Comes to Loading the Big, High Ones Pettibone SPEEDALL Has Height and Reach to Spare!

With 11 ft. 7 in. clearance under the bucket hinge when fully raised, you can see why bigger hauls are being loaded with the Pettibone 1½ cu. yd. Speedall Front End Loader on the job. Even the smaller 1 cu. yd. Speedall clears 10 ft. 2 in.! Reach *from front tires?* Look at this: at 8 ft. dumping clearance the 1½ cu. yd. reaches 3 ft. 5 in.; the 1 cu. yd., 3 ft. 4 in. Compare this with others and you'll buy Speedall! Write for free bulletin.

OPERATOR ALWAYS SEES WHAT'S GOING ON

Fast, accurate loading is assured because the operator is "on top of his work." Spotting what's to be loaded and dumping it is a cinch—no wasted time groping for position! Four wheel drive, rear wheel steer, four big flotation tires—these, too, help even the inexperienced operator look good on a Speedall!

TROUBLE-FREE, BALANCED-DESIGNED FRAME

No front end loader—no, none—has as much *built-in* stamina and ruggedness as Speedall. Take a look at Speedall's clean lines. Examine its husky, balanced designed frame—*no counterweights are used!* Heaping bucketfuls, gathered with *smooth torque converter power,* are, therefore, routine with Speedall!

★ **Torque Converter Is Standard!**

PETTIBONE SPEEDALL Front End LOADERS

Another Member of the Labor-Saving "Speedy" Material Handling Family!

PETTIBONE MULLIKEN CORP.

4700 W. Division • Chicago 51 • SPaulding 2-9300

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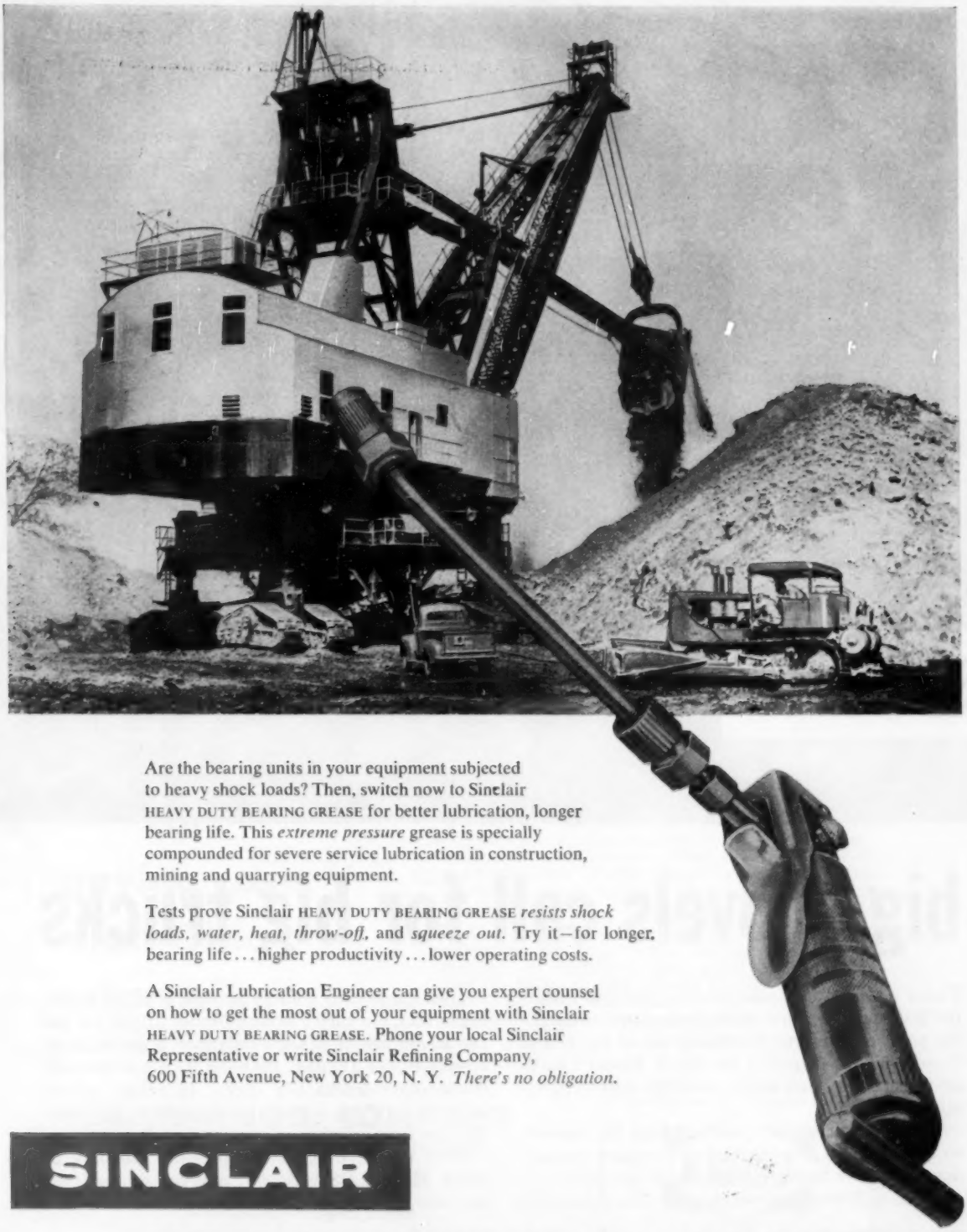
Resists Shock!



Are the bearing units in your equipment subjected to heavy shock loads? Then, switch now to Sinclair HEAVY DUTY BEARING GREASE for better lubrication, longer bearing life. This *extreme pressure* grease is specially compounded for severe service lubrication in construction, mining and quarrying equipment.

Tests prove Sinclair HEAVY DUTY BEARING GREASE *resists shock loads, water, heat, throw-off,* and *squeeze out.* Try it—for longer bearing life... higher productivity... lower operating costs.

A Sinclair Lubrication Engineer can give you expert counsel on how to get the most out of your equipment with Sinclair HEAVY DUTY BEARING GREASE. Phone your local Sinclair Representative or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y. *There's no obligation.*

SINCLAIR

HEAVY DUTY BEARING GREASE

. . . for more details circle 223, page 16

Mack Model LRSW working under a 4-yard shovel on the tough Ardsley-Tarrytown section of New York Thruway.

big shovels call for big trucks

Today's big-yardage jobs demand maximum loads per haul and faster time cycles from shovel to dumping point and return. Increasing use of big 4- and 5-yard shovels points to the Mack Model LRSW six-wheel dump truck as the answer to these stepped-up requirements.

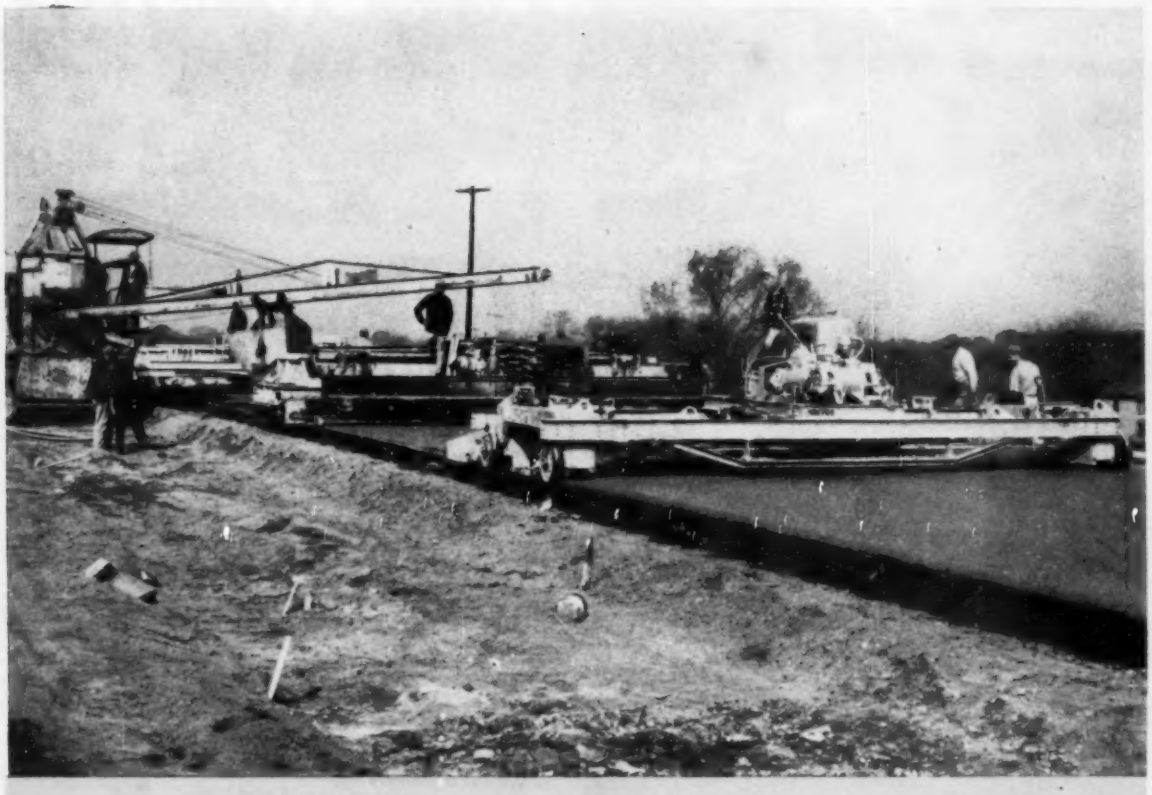
Here's a truck that's built to keep big shovels on the go . . . to give contractors increased production per driver and per truck dollar invested.

Rated at 30 tons payload capacity, it will move 25 heaped yards with unfaltering ease over the toughest terrain. No miring in with Model LRSW—it has the advantage of Mack's Balanced Bogie with exclusive Power Divider, enabling it to pull through where other trucks bog down. In actual service Model LRSW has demonstrated its ability to maintain the time schedule of smaller-capacity dumpers.

Why not investigate the big-unit economy of Mack Model LRSW. It will pay you to see these big jobs at work.

MACK TRUCKS Empire State Building, New York 1, N. Y.

. . . for more details circle 234, page 16



BLAW-KNOX

"COMPLETE PACKAGE"

cuts paving costs on Ohio Turnpike

The first concrete paving on the Ohio Turnpike was finished in December *well ahead of schedule* to speed traffic from the Pennsylvania Turnpike westward. The speedy completion of this contract and the low paving costs are typical of "Complete Package" operations on the majority of turnpike projects.

The Blaw-Knox "Complete Package" gives you advantages you get nowhere else! One source and one responsibility for *all* your concrete paving equipment; one distributor source for prompt maintenance and parts service; low maintenance and high-speed production from the smooth, balanced operation of equipment designed as one "family."

On the Ohio Turnpike job, a Blaw-Knox P-150 Base Paver placed the base material to specifications and a Precision Subgrader brought the subgrade to exact contour and elevation. The contractor also used Blaw-Knox Self-Aligning Road Forms, two Concrete Spreaders (one with vibratory attachment), two Finishing Machines and a MultiFoote 34E Dual Drum Paver.

The Blaw-Knox "Complete Package" also includes Aggregate and Cement Batching Plants, Airport Paving Forms, Clamshell and Concrete Buckets, Road Wideners, Bituminous Paver-Finishers and Adnun Black Top Pavers. See your Blaw-Knox distributor today for the "Package" that's tailor-made with the units *you* need.

BLAW-KNOX COMPANY
Construction Equipment Division

Pittsburgh 38, Pa.
Offices in Principal Cities

BLAW-KNOX

. . . for more details circle 168, page 16

Blaw-Knox Bituminous Paver laying base course on the Garden State Parkway in New Jersey.

The State of Pennsylvania has always been very particular about its asphalt roads. The Blaw-Knox has been approved by the Highway Department of the

The Outer Drive Extension in Chicago—a county job—Here the Blaw-Knox Paver helped to complete the job before the deadline.

DO YOU WANT

BLAW-KNOX *Bituminous Paver* Check List

If you don't have these Bituminous Paver advantages you are losing money!

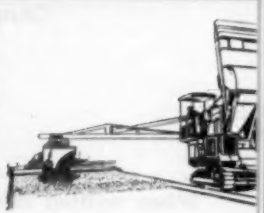
- ***Wheel Steering*** **with long wheel base eliminates the over-steering of crawlers and assures greater accuracy, a smoother course and better joints.**
- **Wheel mounting eliminates the 600 to 700 parts characteristic of crawlers.**
- **Wheel mounting absorbs vibration, reduces chatter in screed and wear and tear on machine.**
- **Dual Controls — handle machine from either side.**
- **Handles boxcar trucks with ease.**
- **Compacts to uniform density and automatically measures and levels.**
- **Long wheel base and leveling principle equalizes ordinary subgrade irregularities.**
- **Simpler, more easily adjusted crowning device.**
- **Easily tows to new location and gets back to lay parallel course in a quarter of the time required for crawlers.**
- **Easy conversion for increased width.**
- ***Outproduces any other asphalt spreader on the market today.***

ADNUN JR.

For those driveway and parking lot jobs the Adnun Jr. will make money. Power saves truck time. Continuous Course Correction gives a smoother surface—and it tows to the job — no trailer is required. Ask for a Catalog.

MULTI-FOOTE

The MultiFoote Concrete Paver has long been a standard for highway paving. Shovel-type crawlers with self-cleaning action, fast charging and discharging, and better vision, mean greater output on the job. Ask for a Catalog.



TO MAKE MORE MONEY ON BLACK TOP PAVING?

● If you are planning new equipment for your black top paving jobs this spring you will be making a serious mistake if you do not get full details on the Blaw-Knox Bituminous Paver.

There has never been anything like it for speed of spreading and for smoothness of surface. Wheel design at once improves control and eliminates some 600 to 700 parts present in crawler units making upkeep easier and less costly.

Wheel design simplifies transportation and reduces truck standing time by easier, faster relocation on the job. With the Blaw-Knox you pave profitably with *any* mix, hot or cold. You pave with automatic leveling and compact to uniform density. You pave with a permanent bond between strips and you pave with the only paver that gives you positive traction at *all times.*

Even if you feel your present equipment is adequate you may cut your costs and increase your profit by replacing it with a Blaw-Knox. You owe it to yourself to get all the details.

. . . for more details circle 186, page 16

On wheels it will pave for less

BLAW-KNOX COMPANY
CONSTRUCTION EQUIPMENT DIVISION
1936 State Street
Nunda, New York

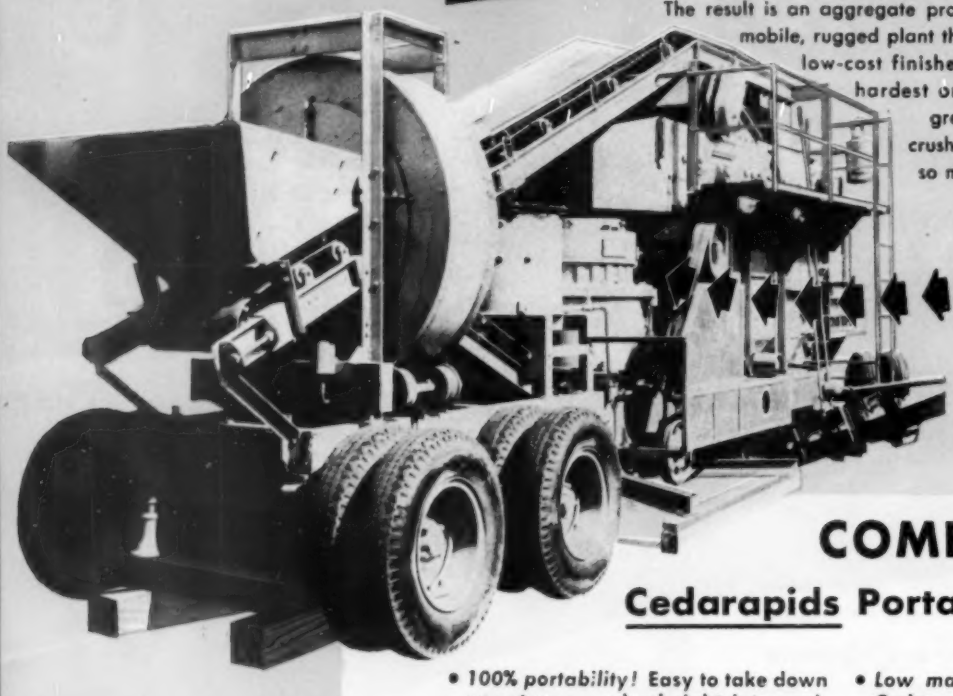
BLAW-KNOX

2 GREAT NAMES IN

join in the newest, finest portable

Cedarapids

Built by IOWA



- CEDARAPIDS . . . and SYMONS! Wherever there's crushing, those two names are synonymous with the best and most efficient equipment available.

Now, in these brand new Cedarapids-Symons Cone Crushing Plants, they are joined to give you a plant that combines the great mobility of Cedarapids portable design with the high capacity and low-cost operation of Nordberg-built Symons Cone Crushers.

The result is an aggregate producer's dream! A highly mobile, rugged plant that gives you big volume, low-cost finished crushing of even the hardest or most abrasive rock or gravel to the uniform, finely crushed aggregate required in so many specifications today.

COMBINE THESE

Cedarapids Portability . . . . . .

- *100% portability!* Easy to take down or set up . . . wheel right into position in the pit or quarry and start producing.
- Meets legal load limitations.
- Use of Horizontal Vibrating Screen permits lower over-all height.
- *Low maintenance* is another great Cedarapids advantage! Exclusive life-seal bearings on all troughing and return rolls, self-aligning bearings throughout, disc clutches, stress relieved screen box, free use of alloy steel, easy access for lubrication and service adjustments.

Use a Cedarapids Portable Primary with the Cedarapids-Symons Cone Crusher Secondary

A Cedarapids Portable Primary ahead of your Cedrapids-Symons Cone Crusher Plant increases production still more, especially in quarry operations. The big Cedarapids 3240 Portable Primary will crush from 150 to 300 tons of big quarry rock. The jaw crusher, with 1280 sq. in. jaw opening, will take rock up to 32" x 40" in size and quickly reduce it to 6" feed for the Symons Cone. Cedarapids Jaw Crusher Primaries are available in sizes from 15" x 24" to 32" x 40". Cedarapids Portable Primaries are also available with Double Impeller Impact Breakers for many quarry conditions.

CRUSHING KNOWN THE WORLD OVER

crushing plants ever offered!

SYMONS®
CONE CRUSHERS

Built by NORDBERG

● Built by Nordberg Mfg. Co., the Symons Cone Crusher is famous throughout the world as the most outstanding crusher ever developed for producing high tonnages of desirable fine-crushed product with the economy that puts more take-home profit in your pocket. It has been proved again and again on every type of job . . . from trap rock to limestone . . . for fast reduction of large size feed to a constant, uniform finished product.

Joining the big output of a Symons Cone Crusher with the high screening capacity of a Horizontal Vibrating Screen in this new Cedarapids Portable Plant gives you the best production features of a permanent installation, adds extremely low operating and maintenance costs . . . and puts it on wheels!

SYMONS . . .
A REGISTERED NORDBERG TRADEMARK

GREAT FEATURES

. . . . . Symons low-cost reduction assures uniformly fine-crushed products

- Controlled feed combined with high impact velocity and wide throw of the crushing head permits rapid flow of material and high ratio of reduction in crushing cavity.
- Maximum utilization of the crushing surfaces.
- Produces commercial aggregate from 6" down in one stage, with minimum circulating load.
- Wide adjustment for quick, positive product size changes.
- Requires much less power and liner replacement than other types of crushers.
- Working mechanism entirely enclosed for years of service with minimum maintenance requirements.

IOWA
MANUFACTURING COMPANY
Cedar Rapids, Iowa, U.S.A.

IOWA MANUFACTURING COMPANY,
Cedar Rapids, Iowa, U.S.A.

Gentlemen:

QUICK! Send me full information about the new Cedarapids-Symons Cone Crusher Plant.

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Company_____

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WHAT'S NEW in Equipment and Materials

Extra Heavy Duty Six-Wheel Truck

A powerful, new, extra-heavy-duty, six-wheel truck model, the International RF-230, specially designed for off-highway service, has been placed in production by the Motor Truck division of International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill. The new model, with gross vehicle weight rating of 60,000 lb. is powered by the new 201 hp International RD-501 engine, which delivers 430 lb.-ft. torque at 1600 rpms.

The International RF-230 is stated to have the power required to haul 60,000 lb. GVW over the roughest type of terrain on off-highway projects, and also the ability to successfully move a heavy load over semi-improved or improved roads for long distances at maximum safe speeds. Equipment includes hydraulic, full-power steering; air brakes; 15,000 lb. front axle; 46,000-lb. rear bogie; 12-volt electrical system; 60-gal., right side, step-type fuel tank; and 15-in. clutch. Standard wheelbase is 175 in.; optional wheelbases are available.

For more information circle 101 on Service Coupon this page and mail now.

Renovating Worn-Out Traffic Signs

Ready-made traffic sign faces — both reflective for nighttime visibility and non-reflective for "daytime only" use — for renovating worn-out traffic signs have been announced by Minnesota Mining and Manufacturing Co., Department G5-4, 900 Fauquier St., St. Paul, Minn. Made of "Scotchlite" brand reflective sheeting or non-reflective "Scotchcal" brand plastic film, the prepared sign faces are pre-cut to size and the legend applied by the manufacturer. On the back of the sign face is an adhesive which, when activated by heat or liquid activator, effects a permanent bond between the sheeting and the sign.

Renovating old signs with the new sign faces involves cleaning the old sign face; trimming the sign face with scissors to the proper size; removing the liner from the back of the sheeting; applying to the sign blank with the heat-lamp vacuum applicator or by hand roller. The renovated sign is ready for immediate use.

For more information circle 102 on Service Coupon this page and mail now.

New A-C Power Unit

Allis-Chalmers Manufacturing Co., Tractor Division, Milwaukee 1, Wis., has redesigned its W-226 heavy duty power unit with a resulting increase in maximum brake horsepower and performance. The new unit when operating on gasoline will develop a maximum 60 brake horsepower at 1800 rpm and 50.6 bhp at 1400 rpm. In addition to the choice of factory installed gasoline, distillate or natural gas fuel equipment that has been available for the W-226 in the past, the new power unit now also offers a factory installed LPG fuel equipment to customers.

A feature of the new unit is the heavy-duty Twin-Disc clutch power take off, also a SAE standard No. 4 flywheel housing. Standard equipment includes an electric starter mounted forward of the flywheel housing; a "no back pressure" muffler; an air inlet pipe cover; easy vision instrument panel for either left or right hand mounting, and a left or right side mounted clutch lever.

For more information circle 103 on Service Coupon this page and mail now.

More equipment news begins on page 106

Increased HP Ratings for Caterpillar Diesels

Recent engineering developments at Caterpillar Tractor Co., Peoria, Ill., have resulted in an increase of horsepower ratings for the company's D397, D386, D375 and D364 diesel engines. The "continuous" ratings of these engines will be up to and including 1200 rpm. The "intermittent" curve is now extended to 1300 rpm. The "continuous" and "intermittent" horsepower ratings of the four sizes of engines offered as diesel industrial engines are as follows:

	D397 HP	D386 HP	D375 HP	D364 HP
1200 rpm (continuous)				
Without Radiator fan	450	360	302	238
With Radiator Fan	430	340	284	220
1300 rpm (intermittent)				
Without Radiator Fan	520	415	350	275
With Radiator Fan	493	388	328	253

The "continuous" ratings of these engines offered as diesel electric sets are as follows:

	KW	KW	KW	KW
1200 rpm				
Without Radiator Fan	315	250	210	165
With Radiator Fan	295	230	200	155
1000 rpm				
Without Radiator Fan	275	215	173	140
With Radiator Fan	263	205	173	135

The company also announced that marine gears for the new increased horsepower D397, D386, D375 and D364 diesel marine engines are available.

For more information circle 104 on Service Coupon this page and mail now.

For more items . . . see page 106

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22 West Maple Street
Chicago 10, Illinois

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Please send me further information and products and materials mentioned in the March Roads & Streets as circled below

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800 FORD TRACTORS!

30% More Power to help you get jobs done on time. Ford's advanced "Red Tiger" engine powers the new 800 series Ford Tractors . . . delivers 42.5 belt and 35 drawbar horsepower.* Here's extra power to move more dirt, handle heavy work loads easier, do more jobs faster!

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Extra weight when you need it! Specially designed wheel weights, sold separately, let you add easily and quickly more than 1150 pounds to the tractor, in addition to loaded tires. And, for special job conditions, you can add as much as 200 pounds to the tractor's front wheels for extra front end stability.

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*Manufacturers Rating

. . . for more details circle 249, page 16

Making Time on the N.Y. Thruway!

Le Roi 600 cfm compressor and Cleveland T-286 drill rig speed drilling operation

Motorists aren't the only ones who travel fast on the N. Y. Thruway. Contractors had to make plenty of time, too.

That's why this contractor made a mobile drilling unit out of his D-8 Cat. He used as components a Le Roi 600 CTM compressor and the Cleveland T-286 drill rig.

The compressor is designed especially for use with D-8 or TD-24 tractors. It is the only unit that attaches directly to the PTO and has a clutch as well. Capacity of the unit is 600 cfm.

The T-286 drill rig consists of two Cleveland patented air feeds, and Cleveland 4" drifters with air-motor booms. Here, it is mounted on the front of the tractor and has a spread of 220 degrees suitable for any variable drill pattern. Ten-foot steel changes, faster set-ups, better hole spacing, greater footage, better fragmentation—mean faster drilling and lower costs.

If you want to make time and cut costs on your rock jobs—just put an old tractor to work this way. Write us for literature that tells how.

LE ROI *Division of Westinghouse Air Brake Co.*

Milwaukee 14, Wisconsin

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. . . for more details circle 206, page 16

ROADS AND STREETS
Sixty-Three Years of Editorial Leadership

Washington News Letter

By Duane L. Cronk March 8, 1955

After four postponements, President Eisenhower's "grand plan" for national highway construction sidled into Congress last month and was promptly hailed by a barrage of ridicule.

Some of the criticism arose from the unfortunate partisan feeling that follows any proposal from a Republican Administration to a Democratic Congress and some was hasty. But most represented the practical political considerations that will help to mold final Congressional approval of a plan to modernize America's highway plant.

* * *

The President's special message, long delayed because of the Formosa war scare and in-fighting over the Clay report, was a restrained request for bold legislation. It cited the high traffic death record, excessive highway transportation costs, civil defense requirements and impending traffic increases as the immediate reasons for remedial action.

The recommendations of the Clay Committee were passed on to Congress substantially the same as reported previously in Roads and Streets, chiefly:

- That a Federal Highway Corporation be created and authorized to raise $20 billion by bond issues and an additional $5 billion for highway construction be appropriated.
- That those funds be expended on the 40,000-mile National Interstate System, now to include urban arterial connections.
- That states be reimbursed for cost of major highways, including toll roads, on the interstate system, that come up to the network's standards.

* * *

Opposition to the financing method proposed developed at once. Chairman Dennis Chavez (D-N. Mex.) of the Senate Public Works Committee declared that the plan is "so full of holes it will probably sink in Congress." He called the scheme "too costly" and said that while it would "please the bond buyers and financiers, it would not build roads."

Senator Byrd of Virginia fired his traditional blast against the proposal because it would cost money. He tagged it "just plain pork barrel" and "inflationary."

(continued on next page)

Senator Gore of Tennessee saw four inadequacies in the proposal. He asserted that the "grand plan" had boiled down from the $101 billion needed to $25 billion, that it neglected all categories of roads and streets other than the interstate system, that it called for an "irresponsible scheme" of financing outside the budget, and that it did not provide for adequate access to interstate routes.

Other rural interests attacked the proposal on similar grounds. Toll road opponents are chafing to be heard on the provisions that would encourage toll financing of sections of the National Interstate System.

* * *

Even before the Administration bill was thrown into the hoppers of both the Senate and House, recommending bond financing of the federal share of the roads program, Senator Gore had drawn up a bill which would seek to provide the means through larger federal-aid matching funds. Its main features were:

- That for a period of five years some $1.6 billion per year in federal aid be appropriated, of which $500 million would go to the primary system, $325 million to the secondary system, and $275 million to the urban extensions.

- That $500 million more be appropriated each of the five years for the National Interstate System.

  That present matching formulas be continued, with the exception that the federal government would match state money for projects on the interstate system, two-to-one.

* * *

Hearings on the bills got under way at once in the Senate and by month's end it was apparent that all the old controversies, along with some new ones, will be aired.

Spokesmen for the three national farm groups revealed how variously opinion can be divided and subdivided. One said that roadbuilding should be left to the states and opposed federal aid increases; another asserted that federal aid should be boosted on the existing basis; and the third declared that Uncle Sam could and should pay for all roads.

It may seem discouraging that the initial bills before Congress should contain so many controversial and apparently irreconcilable differences. At the same time, it is encouraging that both would go far in boosting road construction and that the disagreements are over means of financing a national highway program, not over the need. Beneath the preliminary sparring is a mutual agreement that new and bolder measures must be considered and a compromise found within the next few months to stay further obsolescence of the U. S. highway system.

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Evidence of highest quality engineering and construction includes alloy steels and forgings • anti-friction bearings • modern transmission design with involute splines to add strength and reduce wear • straight-in-line engine mounting with torque converter • trunnion supported tapered drums to eliminate bending stress on drive shafts • easily accessible hydraulic clutches • minimum number of main machinery gears enclosed in one-piece cast gear case • force feed lubrication • self-aligning replaceable hook shoes distribute applied pressure over maximum area • interchangeability of parts simplifies maintenance, cuts costs. All these UNIT advantages mean more profitable operations for you.

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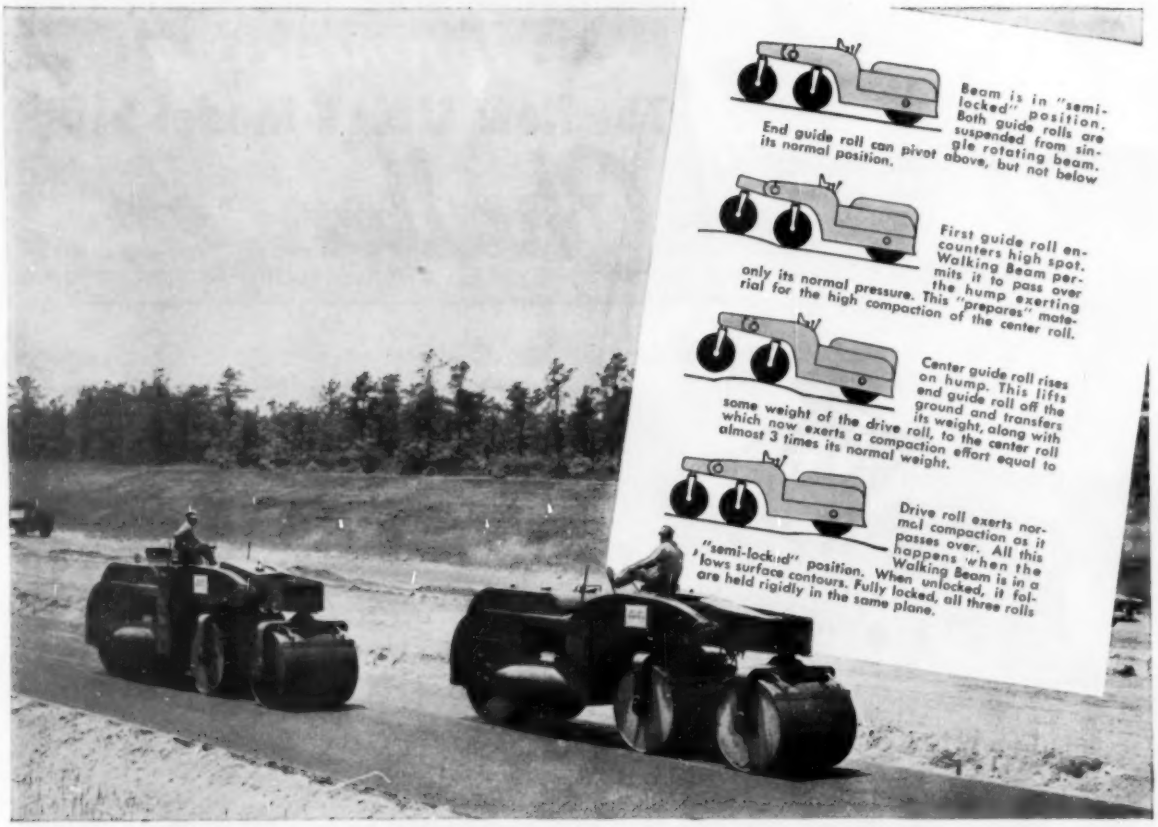
Beam is in "semi-locked" position. Both guide rolls are suspended from single rotating beam.
End guide roll can pivot above, but not below its normal position.
First guide roll encounters high spot. Walking Beam permits it to pass over the hump exerting only its normal pressure. This "prepares" material for the high compaction of the center roll.
Center guide roll rises on hump. This lifts end guide roll off the ground and transfers some weight of the drive roll, to the center roll which now exerts a compaction effort equal to almost 3 times its normal weight.
Drive roll exerts normal compaction as it passes over. All this happens when the Walking Beam is in a "semi-locked" position. When unlocked, it follows surface contours. Fully locked, all three rolls are held rigidly in the same plane.

Extra compaction

. . . where and when it's needed with Buffalo-Springfield 3-Axle Tandem Walking Beam compaction control

The Buffalo-Springfield 3-Axle Tandem is aiding contractors to beat deadlines . . . get more production . . . and build better roads. It will *compact 60% more tonnage* than a standard 2-Axle tandem working on the same type surface. Tests have proven that the roughness indices of pavements compacted with normal rolling equipment are more than twice as great as for the 3-Axle Tandem.

Exclusive "Walking Beam Compaction Control" gives extra *effort when and where it's needed* . . . both guide rolls are suspended from a single rotating beam. The controlled transfer of weight principle *irons out high spots faster and better.*

The illustrations above show how the Walking Beam operates. It may be fully locked, if desired, semi-locked, or completely unlocked to roll vertical curves and warped surfaces.

See your nearest Buffalo-Springfield distributor today. Ask him to show you proof of the many time and money saving features of this roller. Or write for Bulletin S-62-53.

BUFFALO ROLLER COMPANY — **SPRINGFIELD** SPRINGFIELD, OHIO, U. S. A.

THE LEADER IN COMPACTION EQUIPMENT DESIGN AND MANUFACTURE

P. S. . . . In every industry the products of one manufacturer stand out as "The Standard of Comparison" because of certain built-in qualities of excellence. Thus it is, and has been for over 65 years, with Buffalo-Springfield compaction equipment. Contact your nearest Buffalo-Springfield distributor today for additional information on the complete Buffalo-Springfield line.

. . . for more details circle 170, page 16

How one Ohio Contractor gets double-duty from 6 Tournapull prime-movers

Though Contractor C. F. Replogle, Circleville, Ohio, handles a large volume of work and bids in the toughest competition over a three-state area, he has a comparatively low equipment inventory. Behind his 6 C Tournapull prime-movers he quickly interchanges LeTourneau-Westinghouse trailing units to fit the job — 18-ton Rear-Dumps for shovel rock, 16-yard Scrapers for dirt. This way, 80% of his basic equipment investment (prime-mover plus one trailing unit) works *all the time* regardless of type of job.

For example, after 3 of his "C's" with scrapers wound up a dirtmoving job at Loudonville, he switched hauled units to Rear-Dumps. These then joined 3 other Tournapull Rear-Dumps owned by Replogle on relocation of a section of State Highway 7 along the Ohio River near Marietta. There the six LeTourneau-Westinghouse haulers were assigned to move blasted rock and shale from a 4-yd. Lima shovel on this 357,000-yd. job.

Move 480 yds. hourly

On a typical side-hill cut, haulers worked 2000′ cycles over grades ranging up to 30%. According to time studies, shovel filled the built-up Rear-Dumps with 4 passes in about 1½ minutes. Haul and return averaged 4 minutes. Dump and spot at the shovel took another minute, for a total cycle time of 6.5 minutes. Each "C", carrying 16 yards, completed 7 to 8 of the 2000′ cycles per 50-minute hour.

Three of the Tournapulls have now worked 11,000 hours each since their purchase in 1947. The other three machines, bought new in Sept., 1953, have recorded about 2,000 working hours each. Mechanical efficiency for the entire 6-unit fleet has averaged 95%.

"Gives us lowest-net-cost-per-yard"

Says Mr. Replogle, "We consider our C Tournapulls the finest machines on the market. Their low maintenance costs and high output give us the lowest-net-cost-per-yard. Their maneuverability is a great factor, especially on side-hill work."

You, too, will like the production and economy these job-proved LeTourneau-Westinghouse Rear-Dumps and Scrapers will give hauling rock or dirt. Tell us your job conditions . . . we'll send you more owner reports describing how these units handled work similar to yours. Judge for yourself how their high output, plus interchangeability between Scrapers and Rear-Dumps (as well as Bottom-Dumps, Cranes, and Flatbeds), can make more money for you.

Tournapull, Carryall—Trademark Reg. U.S. Pat. Off. RP-660-H-b

Some of the important jobs Replogle has handled with his Tournapulls

1950 . . .

- Graded 4-lane U.S. Hwy. 40 east of Springfield. 300,000 yds.
- Graded site for Calco Chemical Co., St. Marys, West Virginia. 90,000 yds.

1951 . . .

- Graded for the new Ohio Power Company plant at Beverly, Ohio. 700,000 yds.
- Graded State Route 665 near Shadesville, Ohio.
- Moved 200,000 yards for Electro-Metallurgical Co., Marietta, Ohio.

1952 . . .

- Completed State Hwy. 665 near Lockbourne Air Base, Ohio. 40,000 yds.
- Graded section of U.S. Hwy. 22 near Lancaster, Ohio. 60,000 yds.

1953 . . .

- American Gas & Electric Co., Lawrenceburg, Indiana. 600,000 yds.
- Electro-Metallurgical Company, Marietta, Ohio. 150,000 yds.
- Bakelite Company, near Marietta. 80,000 yds.
- Graded railroad line, plant site, and stripped gravel pit for Central States Gravel Co., Chillicothe. 30,000 yds.
- Graded U.S. Hwy. 50, 10 miles east of Chillicothe. 80,000 yds.

Converted for scraper work, 3 of Replogle's Tournapulls and 2 tractor-drawn Carryalls moved 40,000 yards to eliminate sharp curves and build bridge approaches on Ohio Route 3 near Loudonville. On 1800 ft. cycles, each 14-yd. Tournapull delivered 10 loads of sandstone and dirt per 50-min. hour. Total output per Tournapull was 2.7 times that of each crawler-drawn 15-yd. pan.

LeTourneau-Westinghouse Company PEORIA, ILLINOIS
A Subsidiary of Westinghouse Air Brake Company

. . . for more details circle 239, page 16

HOBBS TRAILERS

HELP YOU HAUL MORE PAYLOAD!

- LOWER EQUIPMENT COSTS
- REDUCE MAINTENANCE COSTS
- INCREASE OPERATING EFFICIENCY
- INCREASE YOUR PROFITS

Take full advantage of Your State Bridge Formula Laws

HOBBS *Schonrock Cable Dump* TRAILERS *CAN TRIPLE YOUR TRUCK EFFICIENCY*

Your truck equipped with Hobbs Schonrock Cable Dump Trailer hauls three to four times as much dirt, sand, gravel or aggregate as one equipped with an ordinary dump body. This trailer can be built in any length—long enough to give you full benefit of maximum payloads allowed by bridge formula laws. This is made possible through exclusive, patented booster cam fifth wheel.

HOBBS SELF-LOADING FLOATS

ENABLE ONE MAN WITH WINCH-EQUIPPED TRUCK TO LOAD AND UNLOAD AS MUCH AS 100,000 LBS.

Ideal for moving ditching machines, bulldozers and other heavy equipment. Specifications available on request for single axle rated at 30,000 pounds and tandem axles rated at 50,000, 75,000 and 100,000 pounds.

HOBBS WINCH AND GIN POLE BODIES

Increase the usefulness of your utility truck with a Hobbs Winch and Gin Pole Truck Body. It performs heavy lifting, winching, loading and carrying. Hobbs heavy duty Headache Posts let you winch from a side angle, carry chain and boomers. Bodies for single and tandem axle trucks: 1½ to 12 tons.

For Complete Information, Specifications and Prices Contact

HOBBS MANUFACTURING COMPANY 609 NORTH MAIN STREET FORT WORTH, TEXAS

SALES AND SERVICE IN 38 STATES AND MAJOR CITIES — DISTRIBUTORSHIPS AVAILABLE IN SOME AREAS

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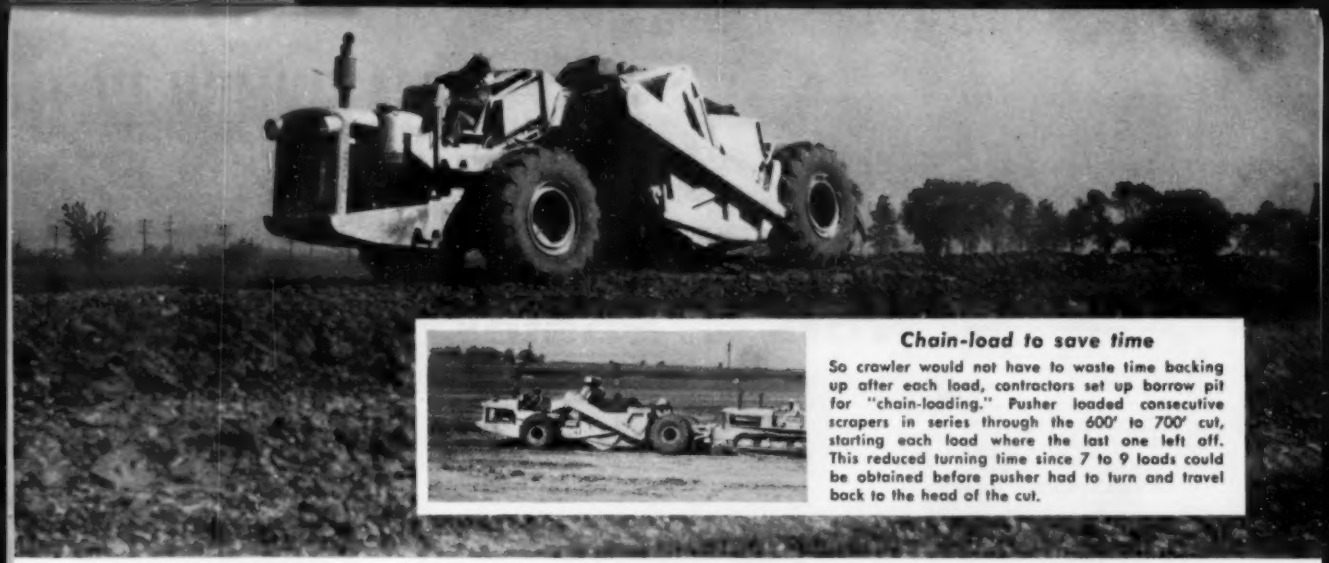


Chain-load to save time

So crawler would not have to waste time backing up after each load, contractors set up borrow pit for "chain-loading." Pusher loaded consecutive scrapers in series through the 600' to 700' cut, starting each load where the last one left off. This reduced turning time since 7 to 9 loads could be obtained before pusher had to turn and travel back to the head of the cut.

How General Paving did 11 weeks work in 37 days

GENERAL PAVING COMPANY, Champaign, Illinois, usually use their 2 D Tournapulls for finish work and other small-yardage self-loading assignments. Yet, ample capacity and high working speeds make these 7-yd. "handymen" practical and profitable to fit in with a fleet of larger rigs when the company wants to get more dirt moving on the big cuts.

This versatility proved particularly important to General when they relocated 9½ miles of State Hwy. 45 near Rantoul. Here, 450,000 cu. yds. of hard clay, gumbo, topsoil, and wet sand had to be moved in a few months.

Tournatractor's main job on this contract was leveling and compacting the fill. The 6 sheepsfoot rollers being pulled total 26,400 lbs. Rig also tows equipment, push-loads scrapers, takes out trees, and handles scattered dozing assignments.

In order to meet the tight schedule, contractors started dirt work in late winter with the 2 "D's", 2 larger electric-control "C's", 2 Super C Tournapulls, and a rubber-tired Tournatractor. Bad weather interfered, however. During the first 13 work weeks, the job had to shut down completely for 6 weeks. When the rain and snow finally stopped, contractors put all 6 Tournapulls on production work and the Tournatractor on the fill.

Move 312 yds. hourly

Even then, the going was rough. At the time these photos were taken, loads were being taken from a wet 10-ft. cut that was difficult to enter because of the steep side slopes. Despite this, time studies made on 2-mile cycles show all 6 Tournapulls each delivering 5 to 6 loads per 50-minute hour. On a yardage basis, the two 7-yd. "D's" moved a total of 69 pay yards of clay hourly; the two 15-yd. Super "C's", 111 pay yards; the two 16-yd. electric "C's", 132 pay yards. Combined output: 312 cu. yds.

With this high rate of output, 45% of total yardage was moved in 37 working days! Instead of being way behind schedule, the job was slightly ahead. By the time the job was over, the 4 electric-control Tournapulls had worked so fast they had moved 75% of all dirt. The 2 mechanically-controlled Super "C's" and a fleet of fifteen 5-yd. trucks, working with an elevating grader in the easiest dirt, moved the remaining 25%. Compaction for both scrapers and trucks was handled by the 1 Tournatractor pulling 6 sheepsfoot rollers.

Supt. likes maneuverability

As you might expect from this performance, users are well satisfied with their LeTourneau-Westinghouse machines. Says General Superintendent Tom Kelly, "We like the 90° turn of the electric Tournapulls—particularly on a narrow fill or roadway."

Dirt Superintendent Dan Kelly adds: "These LeTourneau-Westinghouse machines sure operate easy. They move a lot of dirt. Of all the equipment we've ever had, we've had less downtime with Tournapulls and Tournatractors than with any others."

Ask for a demonstration

Like General Paving Company, you will find it pays to include fast, versatile Tournapulls and Tournatractors in your fleet. Get all the facts on performance, prices, and delivery from us today. There's no obligation.

Important Horsepower Changes		
	Former Machines	Present Production Models
D Tournapull*	122 hp	138 hp
C Tournapull*	186 hp	208 hp
B Tournapull	None	293 hp
Tournatractor*	186 hp	208 hp

*Machines on this job are the earlier models

Tournapull—Trademark Reg. U.S. Pat. Off.
Tournatractor—Trademark TDP-688-H-b

LeTourneau-Westinghouse Company

PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

. . . for more details circle 240, page 16

Modern WHITE Trucks Get Today's Call for More Work . . . Faster

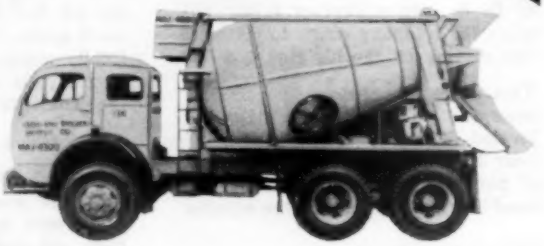
HUSKY White Dump Trucks with compartments for five 1.385 cu. yd. batches are on a fast job delivering material to pavers on a huge apron pavement at Davis-Monthan Air Force Base, Tuscon, Arizona.

YOU'LL ALWAYS see White Trucks on the tough jobs where schedules are tight, loads are big and working conditions rugged.

In the big and busy construction industry, Whites are doing all kinds of jobs with remarkable records of time and cost saving.

In your business, too, Whites are a big help—especially where there is need for more work . . . faster . . . at lower cost. Because Whites are engineered right to job specifications. They are built to do your job faster, better and more economically.

Have a tough transportation job that has you puzzled? Call your White Representative . . . now!



This White Model 302264 six-wheeler hauls 6 yards of mix with 255 gallons of water within legal limits for Cleveland Builders Supply Co., Cleveland, Ohio.

White

THE WHITE MOTOR COMPANY
Cleveland 1, Ohio

For More Than 50 Years The Greatest Name In Trucks

MODERN DESIGN

MODERN POWER

MODERN USEFULNESS

It takes all three! And White puts them together in its complete line of motor trucks engineered to exact operating conditions for new usefulness, new economy and new efficiency.

MODERN DESIGN! There's nothing like the White 3000 with the power-lift cab. New payload advantages! Exclusive design and weight distribution.

MODERN POWER—yes! With the amazing higher-compression White Mustang Engines in a range of sizes up to 200 hp. More power per pound of engine weight!

AND USEFULNESS! It's the big pay-off with the White 3000 because these handsome, new Whites get more work done, in less time, at lower cost.

There's a White That Will Cut Your Costs . . . Earn Money For You—Do More Work.

. . . for more details circle 236, page 16

D. W. WINKELMAN CO. praises D Tournapull clean-up ability

Works 7-yard "D's" behind fleet of 9 C Tournapulls on 6.6 mile, $7,278,000 section of NYS Thruway

To help move more than 1,800,000 cubic yards of clay, gumbo, gravel, loam and sand on 3 New York Thruway contracts near Syracuse, D. W. Winkelman Co., Inc., brought in 10 electric-control Tournapulls and a rubber-tired Tournatractor . . . added them to their fleet of bottom-dumps, shovels, and crawlers.

Clearing rocks after paving, "D" triples output of front-end loader

To pick up scattered accumulation of rocks and smaller debris following paving and shoulder grading of the Liverpool Interchange, Winkelman called on a D Tournapull and a motor grader. The grader first windrowed all rock to the center of the completed slab. Then the Tournapull operator came along at 20 to 25 mph, lowered his blade to "float" on the roadway, and scooped up the stones. With this speed, he picked up 100' to 150' of windrow per pass. Rocks wouldn't boil, so there would have been no use trying for bigger loads by push-loading. Even without pushing, the company called this the cheapest method they knew of to handle the material. The Tournapull, they reported, picked up about 3 times as many rocks in a day as could a front-end loader. Tournapull's low-pressure tires rolled over both newly-set concrete and soft shoulders without causing damage.

The company was particularly pleased with the performance of their D Tournapulls used mainly for scattered clean-up behind both scrapers and bottom-dumps. These machines, Winkelman officials explained, proved ideal for the small-yardage sections of their big job. D Tournapulls also have ample capacity and speed to work profitably with the bigger machines in pusher fleets. They travel under their own power between all jobs at speeds up to 28 mph.

For example, on Winkelman's contract for dirtmoving at Liverpool (near Syracuse), the 7-yd. "D" shown helped regrade approaches on a park entrance road underpassing the Thruway. Unit self-loaded dirt from center of road and spread along the shoulders over widely varying cycles. It also bladed the shoulders, sloped banks, filled around culverts, etc. Job was finished in 1 day.

At other times, the versatile "D" removed excess gravel and fine-graded between paving forms . . . spread topsoil on shoulders and backslopes . . . cleaned accumulated boulders off roadway . . . and, with its extremely short turning radius (12'8"), did a variety of other clean-up, finishing and backfilling jobs where larger units would not have been economical.

"The 'D' is one of the handiest machines ever made for clean-up work," reported the grade superintendent.

It will pay you to investigate Tournapulls. You'll find a size to fit your needs. Call us for details on price . . . performance . . . and delivery.

Tournapull—Trademark Reg. U.S. Pat. Off., Tournatractor—Trademark PDP-604-H-b

LeTourneau-Westinghouse Company

PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

. . . for more details circle 241, page 16

AN OUTSTANDING NEW TEAM for Ditching, Digging

INTRODUCING
the Allis-Chalmers
WD-45 Wheel Tractor
with Henry Backhoe

Whether it's digging ditches, trenches, culverts, footings or foundations, you'll find this team's power, mobility and versatility ideal for use on any dirt-moving job. Check the features that make this machine a big performer at low cost:

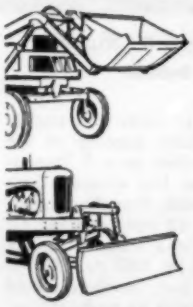
PLENTY OF POWER — for big-scale production. The WD-45 engine with POWER-CRATER design develops over 45 belt horsepower . . . to give you more power per dollar . . . more work capacity than other tractors of this type. Thousands already in use have given the WD-45 nationwide fame as a performance leader.

PLENTY OF WEIGHT — 5,325 lbs distributed right, give you the added traction and stability you need for tough, heavy digging and backfilling. It's a combination of a big, rugged wheel tractor and heavy-duty hoe to give years of continuous service.

MANY OPERATING FEATURES — let the operator do an efficient, thorough job in less time. With two-clutch control, the operator saves time because he can keep tractor in low gear while digging — can start and stop it on short moves with easy-to-reach hand clutch. The bucket, working like a giant hand, reaches out 12 ft, 8 in . . . digs 8 ft down . . . swings 160 degrees for wide area dumping. Backhoe assembly is all-steel, box-channel construction to take rough, hard use.

MANY SERVICE ADVANTAGES — will save you money. Engine features like exhaust valve rotators, removable cylinder liners, pressure lubrication give long life and lasting performance. Backhoe features, like replaceable bushings on all wear points, provide easy maintenance.

PLENTY OF VERSATILITY — keeps the WD-45 with backhoe busy all the time. The unit is mobile enough to reach any job, especially the hard-to-get-to places. With power-shift rear wheels, the tread can be adjusted in less than five minutes when extra stability is needed. Choose from six interchangeable buckets, 16 to 24-inch widths. Front-end loader and backfill blade attachments are available as optional equipment.



See the world-famous WD-45 with Henry Backhoe at your Allis-Chalmers industrial dealer, or write direct to the company for literature.

ALLIS-CHALMERS
TRACTOR DIVISION — MILWAUKEE 1, U. S. A.

. . . for more details circle 162, page 16

NOW-SEE WHY

You Cut More Concrete with Clipper® CONCRETE SAWS

"SAWS RIGHT THRU"

--LOOK INSIDE

Behind Engine . . .
Under Frame . . .
for Famous . . .
CLIPPER QUALITY
plus 5 of the EXCLUSIVE FEATURES

THAT GIVE YOU LOWEST CUTTING COST PER FOOT!

Model C-250
25 H.P. Optional
Self-Propelled.
A Clipper Model
to fit Every Budget
Priced from $395

ASK FOR **FREE** DEMONSTRATION ON YOUR JOB

Clipper® BLADES For Best Results

- **CLIPPER "GREENCON"**
  Savings you never dreamed of—up to 80%! The original Reinforced Abrasive Blade that knifes through green concrete with aggregate of limestone, coral, or steel mill slag. "Try them on your next job."
- **CLIPPER DIAMOND**
  A Blade for any job—any aggregate—every saw! Choose your Clipper Diamond Blades from a wide variety of specifications to cut green or old concrete with outstanding speed and economy.

By the Makers of Clipper Masonry Saws

LOOK AT THESE 5 FEATURES

1. 4 Wheels with 3-Point No-Bind Blade Suspension
2. Self-Propelled with Abrasive-Coated Drive Wheels
3. Positive Screw Feed
4. Patented Water Application
5. Dashboard Controls

Send Coupon for the Whole Story

Clipper® KANSAS CITY, MO.

Better Mail the Coupon NOW!

Genuine Clipper Products Are Sold Only Direct. Immediate Shipment from Factory Branches in Principal Cities, Coast to Coast. Mail Coupon for Same-Day Service.

CLIPPER MANUFACTURING CO.
2820 E. Warwick • Kansas City 8, Mo.

- ☐ I want a FREE DEMONSTRATION of a Clipper Concrete Saw.
- ☐ Send FREE Literature on Clipper Concrete Saws and Blades.
- ☐ Send FREE Literature on Clipper Masonry Saws and Blades.
- ☐ Have a Clipper representative call on me.

403X

Name_____

Address_____

City_____ State_____

. . . for more details circle 246, page 16

WHY BUCYRUS-ERIE Individual Design*

MEANS Top Performance with ANY Front End

BUCYRUS-ERIE INDIVIDUAL DESIGN provides a perfect match of excavator to rated load, regardless of which front end you use.

Whether you use your Bucyrus-Erie as a crane for setting bridge steel, as a dragshovel for trenching, or as a shovel, dragline, or clamshell for excavating or loading, you have a machine that works efficiently because it is *right* for its rating — from treads to boom point.

Because of Individual Design, you can switch front ends to meet job requirements and always be sure you'll get the consistent high output you want—along with low maintenance and long life.

See your Bucyrus-Erie distributor for the full story. He'll tell how Individual Design can cut *your* operating costs and increase *your* output.

14E54

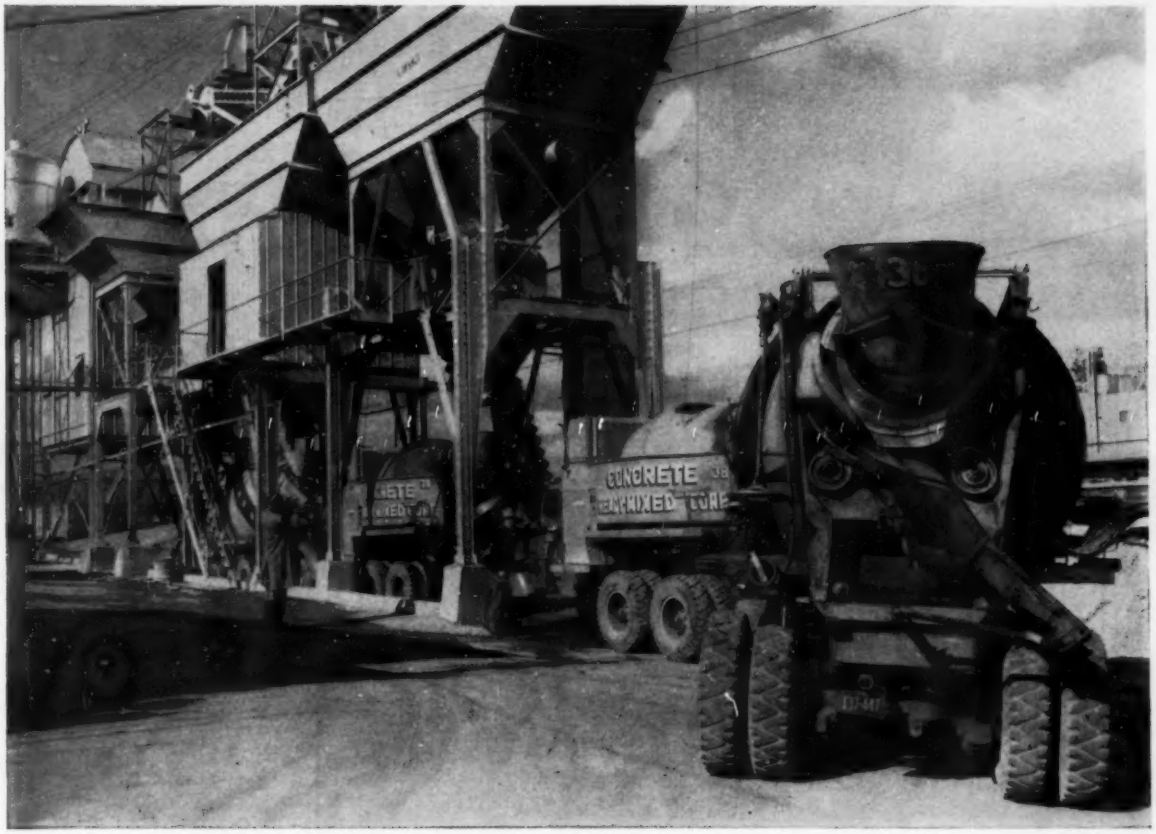
BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

*** Individual Design**

means that each model is built from the ground up to handle a specific load most efficiently. There are no oversize or undersize dippers, no overpowering, no compromise in stress or safety limits simply to create "new" models. Each part is properly designed to coordinate its function with the whole machine for the greatest efficiency at the rated load.

. . . for more details circle 169, page 16

B.F.Goodrich



Universal tires average 40,000 miles in concrete delivery service

THE Concrete Ready Mixed Corp. delivers concrete to construction sites around Roanoke, Va. The trucks work 60 hours a week hauling gross loads of 20 tons over all types of roads, often over no roads at all.

CONCRETE READY MIXED CORP. reports they save 60% by being able to recap B. F. Goodrich Universal tires. They say the specially-compounded Universal tread gives so much traction, they never need chains.

. . . for more details circle 192, page 16

For rugged service like this, the company specifies B. F. Goodrich Universal tires, reports they defy rock cuts and bruises, roll 40,000 miles and can be recapped!

All-Nylon cord body

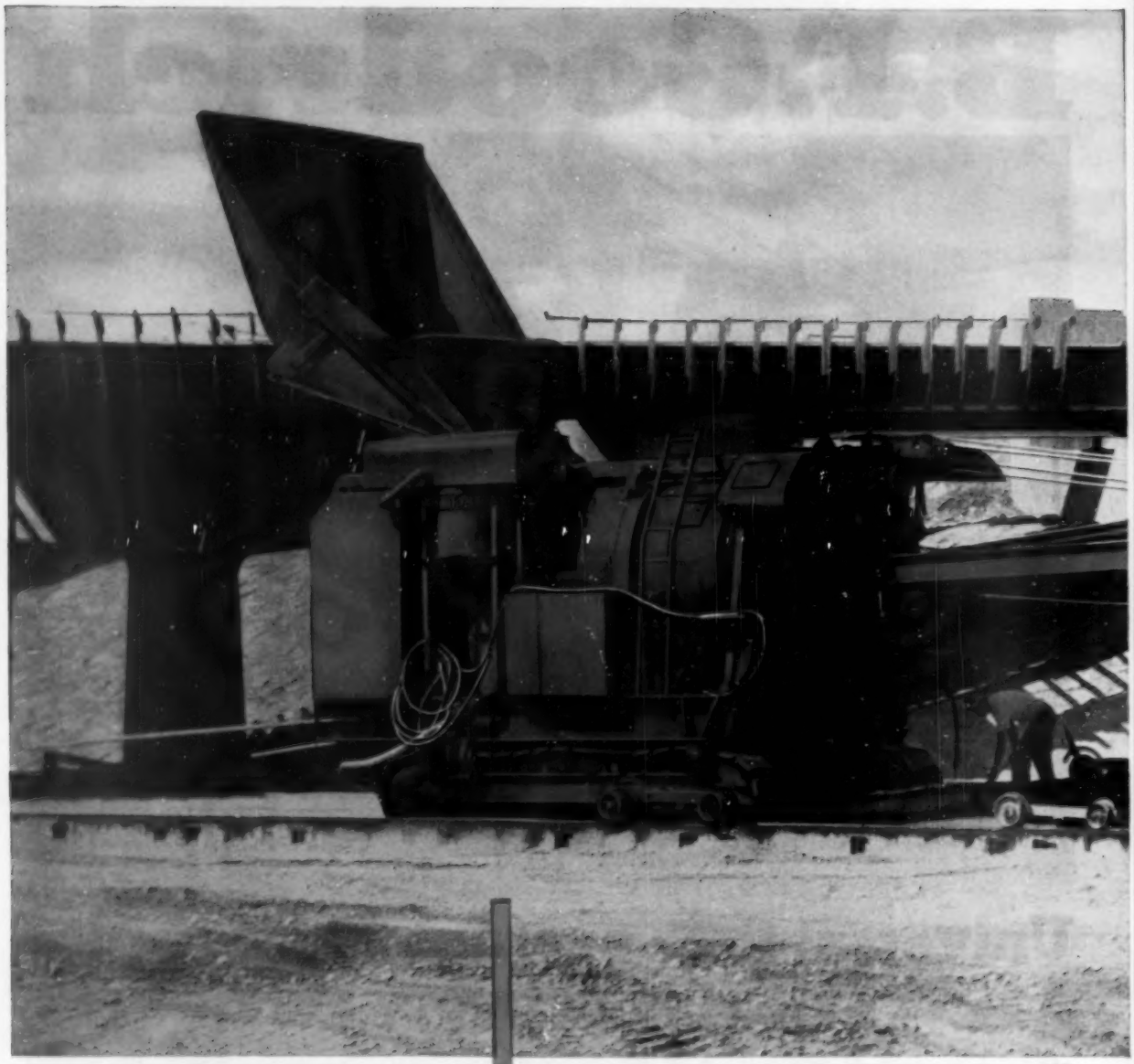
Universal tires wear longer because they are built with an all-nylon cord body (sizes 12.00 and larger). Nylon is stronger than ordinary cord materials, withstands double the impact and resists heat blowouts and flex breaks.

Under the tread is the B. F. Goodrich nylon shock shield. Layers of strong nylon cords stretch together to absorb and distribute impacts and shocks. Result: Universal tires wear longer, can be recapped more times. You pay nothing extra for this patented B. F. Goodrich nylon shock shield.

See all-nylon Universal tires at your B. F. Goodrich retailer's (smaller sizes in all-nylon or rayon construction). They'll cut your tire costs by giving you longer, trouble-free service. For the BFG address, look under Tires in the Yellow Pages of your phone book, or write *The B. F. Goodrich Company, Tire & Equipment Division, Akron 18, O.*

Specify B. F. Goodrich tires when ordering new equipment.

RESEARCH KEEPS B.F.Goodrich FIRST IN RUBBER



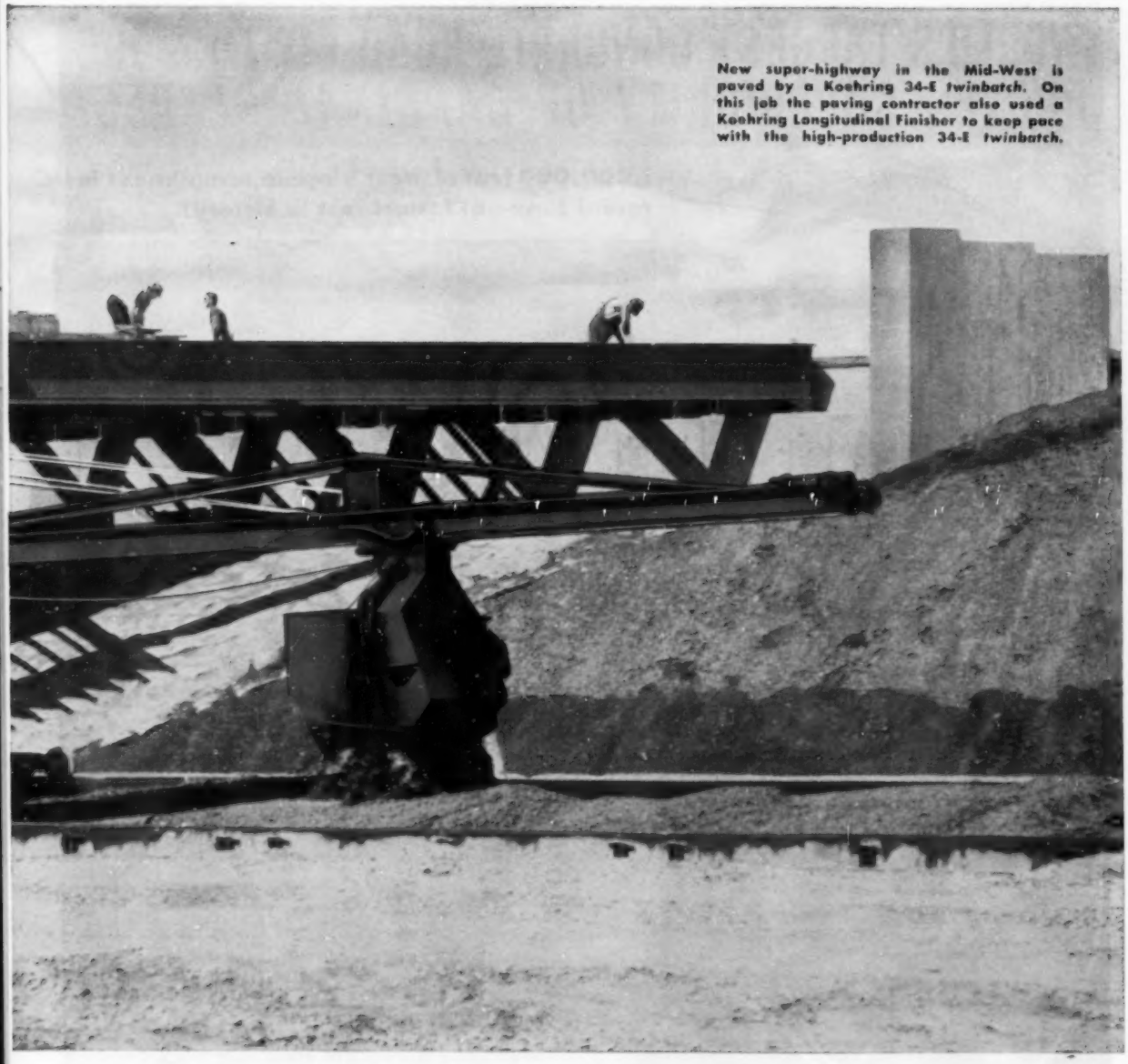
Reserve production capacity gains

40 EXTRA BATCHES A DAY

Koehring 34-E *twinbatch*® paver

hits a top output of 86.7 batches an hour, on 60-second mixing cycle. It maintains high average batching speed because — with *twinbatch* Autocycle mixing — there's plenty of reserve production capacity when you need it to offset normal job delays. This lets you pick up lost time which cannot be made up with limited-production single-drum pavers. For example:

A single-drum paver theoretically mixes up to 50 batches an hour, but usually averages only about 45 batches due to normal production delays. Under identical job conditions — and with the same set-up of auxiliary equipment — Koehring 34-E *twinbatch* easily averages 50 batches an hour, 8 hours a day. You gain 5 extra batches an hour



New super-highway in the Mid-West is paved by a Koehring 34-E *twinbatch*. On this job the paving contractor also used a Koehring Longitudinal Finisher to keep pace with the high-production 34-E *twinbatch*.

over the single-drum paver — 40 extra batches a day. Yet, it requires only about 3 extra batches a day to offset the slight additional cost of a 34-E *twinbatch* paver. That leaves a net gain of 37 extra batches per day to help maintain schedules, complete more jobs per season, and earn more profits per job.

No expense for extra equipment

You get this extra paver production with no additional investment in auxiliary equipment. By maintaining 50 batches an hour, the Koehring 34-E *twinbatch* keeps your present batch plant, hauling and finishing equipment working at maximum efficiency. What's more, this increase over single-drum paver production requires no extra paver operating expense, service or maintenance. The 34-E *twinbatch* is as simple as a single-drum machine. Basic units are the same, except for the double compartment drum — and, the Koehring 34-E is easier to operate because, with *twinbatch* Autocycle control, every mixing operation is automatic, accurate and fast.

You'll be miles ahead on your highway, airport and other big-production paving contracts with a Koehring 34-E *twinbatch* paver. Better see your Koehring distributor about it today, or write for bulletin. Also look into the mobile, rubber-tired 16-E *twinbatch* for smaller jobs.

KOEHRING COMPANY

Subsidiaries: JOHNSON
PARSONS • KWIK-MIX

Milwaukee 16,
Wisconsin

K538

. . . for more details circle 203, page 16

WORLD'S LARGEST CONCRETE ROAD CUTTING JOB PROVES SUPERIORITY OF *CARDINAL BLADES!*

1,000,000 feet of West Virginia turnpike cut in record time—at lowest cost in history!

In cooperative effort with William F. Middlestadt of Seals, Inc., of Baltimore, who furnished equipment and personnel, CARDINAL NON-BRAK BLADES cut a 68 mile x 1½ inch longitudinal joint in this new two lane highway, and a 24 foot transverse joint every 18 feet . . . total—1,000,000 lineal feet through limestone aggregate. Job completed with CARDINAL NON-BRAK BLADES in record time at a record low cost.

When you work with CARDINAL, you work with blade men who know the concrete cutting business . . . men who will frankly tell you when a rugged, low-cost CARDINAL NON-BRAK BLADE will do the job on green concrete, at less cost than a diamond blade . . . or, when a CARDINAL DIAMOND BLADE will give you the best deal, cost-wise, on aged concrete or other hard specifications. More footage per day . . . less cost per cut—that's the kind of guarantee that makes good sense. Call, write or wire, today!

Cardinal

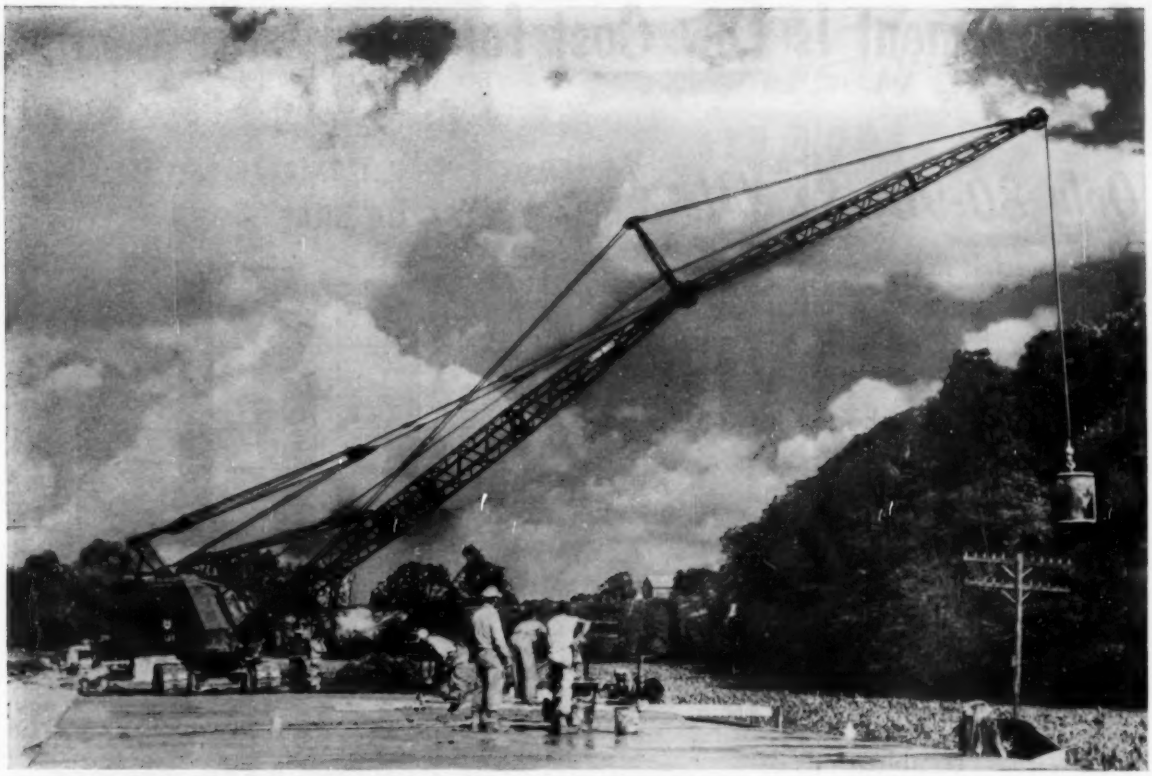
ENGINEERING CORPORATION

World's Largest Exclusive Manufacturer of Concrete Cutting and Masonry Blades

144 BURNSIDE STREET, PHILADELPHIA 27, PA., U. S. A

Branches or Distributors in Most Principal Cities

. . . for more details circle 171, page 16



FAR REACHING, NEW LS-88 uses jib to spot concrete bucket on road job. Patented high gantry is raised and lowered under power, one of many optional extras.

Long, wide and exceptionally stable crawler mountings and shoe widths are available to suit any heavy-duty, ¾-yard job. All clutches are interchangeable.

UP TO 25% MORE OUTPUT — Speed-o-Matic power hydraulic controls cut fatigue. No lag, jerk or strain.

AHEAD ON ½-YARD JOBS — It's the new LS-58, fastest, most powerful rig in its class, with "big-rig" features.

UP TO 99 NET HP FOR 1-YARD PROFITS — New heavy-duty LS-98. First time Speed-o-Matic in this class.

How to be AHEAD on every job

...use a Link-Belt Speeder! It's years ahead of the shovel-crane industry

TEAM up with the shovel-crane line that gives you the most productive capacity. It's the only line that offers you true power hydraulic Speed-o-Matic control, *and it's on every model.* Choose from many new models—with pace-setting improvements—in the ½ to 3-yard, 10 to 60-ton range. Equip for extra speed, power and work range—to bid successfully on more jobs—*and earn more on all of them.* See your Link-Belt Speeder distributor for complete facts, or write: Link-Belt Speeder Corporation, Cedar Rapids, Iowa.

LINK-BELT SPEEDER 13,772

Builders of a complete line of crawler and rubber-tired shovel cranes

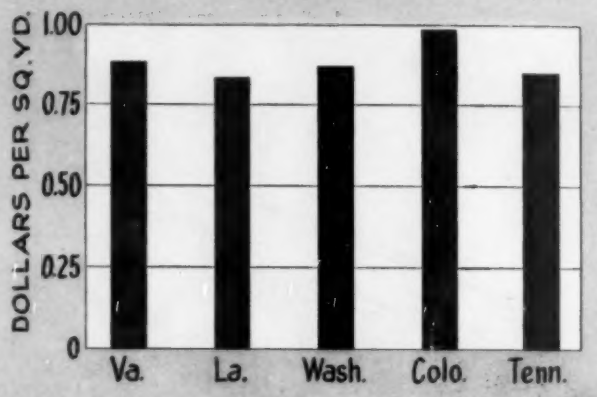
. . . for more details circle 207, page 16

Soil Cement Is Low Cost for Road Base Course

Only 80-90c Sq. Yd!

Base materials native to the job can be used in many states. Even with imported materials, soil cement base course costs are lower in the long run. In the last 13 years soil cement paving awards increased from 9 million to 140 million square yards... that's a 1,555% increase!

AVERAGE SOIL CEMENT BID PRICES ROAD BASE COURSE—1953



TAKES HUGE LOAD!

These various combinations of surface materials placed over soil cement base course show the tremendous load bearing value. As in airport construction, load bearing value is an extremely important factor in long life for roads and streets. It will pay to investigate!

Write for Case History File...Today!

AIRPORT LOAD-BEARING DATA WITH SOIL CEMENT BASE COURSE

BASE COURSE TYPE	BEARING VALUE K
6" Soil Cement 8" Compacted Gravel	535 355
6" Soil Cement 5½" Macadam + 2" Bituminous Surface	1012 626
6" Soil Cement + 2" Bituminous Surface 6" Emul. Stab. + 2" Bituminous seal	475 240
6" Soil Cement 6" Sand-Clay + Bituminous seal	735 520
6" Soil Cement 8" Sand-Clay + Bituminous seal	940 520
6" Soil Cement + Bituminous seal 8" Bituminous Stab. + 2" Bituminous Surface	424 255

Most Soil Cement Is Mixed With Pettibone Wood Mixers!

Model 42 Roadmixer Illustrated—Single Pass, Self Propelled; Model 54, Single Pass, Tractor Drawn and Powered also Available. Capacities up to 350 tons per hour.

PETTIBONE WOOD MFG. CO.

6900 Tujunga Avenue, North Hollywood, Calif. • STanley 7-3281

Subsidiary of PETTIBONE MULLIKEN CORP., Chicago, Illinois

. . . for more details circle 218, page 16

LORAIN 85

WHAT'S *NEW* IN THE LORAIN-85

★ **FULL AIR CONTROLS** ★ metered air operation of shovel crowd and retract clutches ★ power boom lowering and derricking ★ crawler travel in both directions ★ dipper trip ★ crowd brake ★ crawler steering ★ tread lock ★ air operation of travel and crowd jaw clutches available.

★ **GREATER OPERATING RANGES** ★ 26 ft. shovel boom to dig and load higher ★ 27 ft. hoe boom to dig deeper.

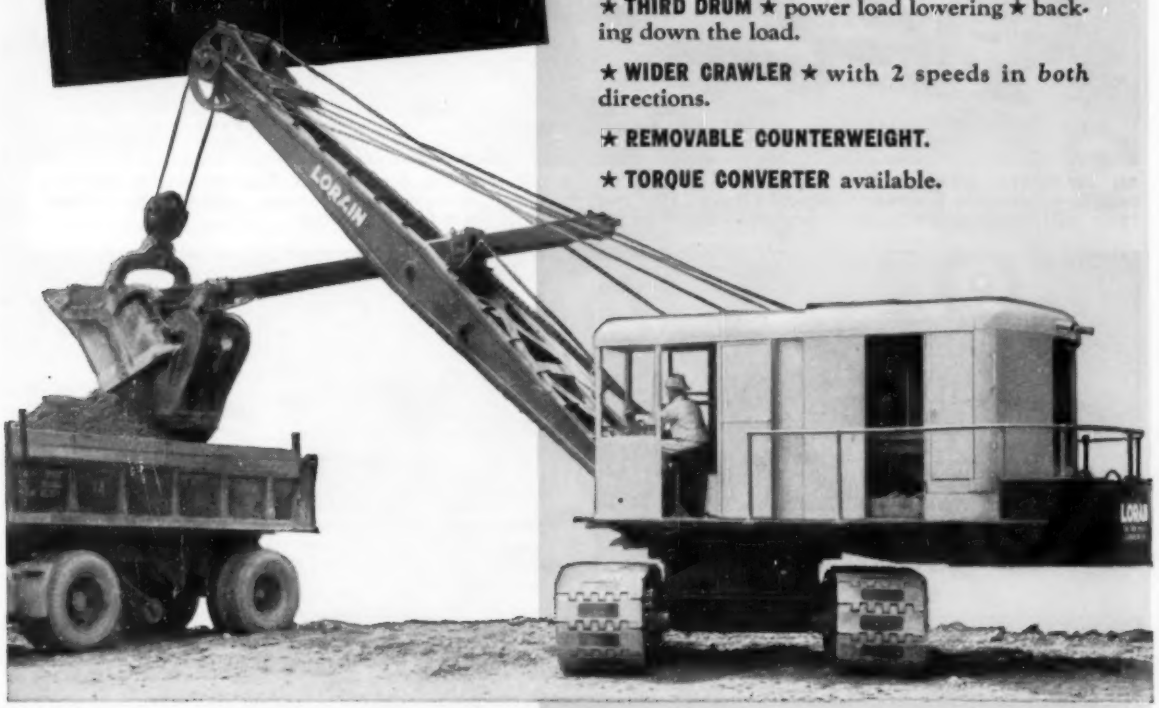
★ **GREATER CAPACITY** ★ 45 tons lifting capacity.

★ **THIRD DRUM** ★ power load lowering ★ backing down the load.

★ **WIDER CRAWLER** ★ with 2 speeds in *both* directions.

★ **REMOVABLE COUNTERWEIGHT.**

★ **TORQUE CONVERTER** available.



Just look at all the new advantages you get in the new Lorain-85. And remember, they are in addition to all the time-tested features of Lorain's big-machine design and construction. For example, you still get Lorain's center-drive design that allows full engine power to be concentrated on any one operation or divided between as many as three simultaneous operations — Lorain's smooth, shock-absorbing Hydraulic Coupling power take-off for "never-say-die" application of power. This new Lorain-85 is designed and built to out-perform and outlast everything else in the 2-yard class. Get all the facts today!

THE THEW SHOVEL CO., LORAIN, OHIO

THERE IS MORE TO THE STORY ABOUT THE NEW LORAIN-85. YOUR NEARBY THEW-LORAIN DISTRIBUTOR WILL POINT OUT EVERY NEW FEATURE.

THEW LORAIN®

. . . for more details circle 227, page 16

COMPACTING EARTH FILLS

ON HIGHWAYS, AIRPORTS AND DAMS, new records are being set every day by Southwest Compaction Rollers. Here two 75-ton rollers and Cat DW21 tractors are compacting 6" to 12" lifts with only 4 to 6 passes. They are keeping pace with the largest earth-moving equipment working on 24-hour job schedules in the High Sierras.

ONE YEAR AHEAD of schedule! This record on a large earth fill dam is partially due to the improved high speed of compaction by Southwest Rollers which are used exclusively on this job.

SPEED PAYS OFF! A fleet of four 50-ton Southwest Rollers, with Cat and Le Tourneau tractors, use their weight, their kneading action of tires and extra oscillating freedom to permit faster traveling.

ADAPTORS FOR TRACTORS, most models or types, are available at Southwest. On highway and housing projects, small 20-ton Compaction Rollers can be towed by motor graders or other power equipment.

VERSATILE! Any standard 4-section Compaction Roller can be converted into a 3-, 5- or 6-section roller. Parts for conversion are available as a complete package.

CONSTRUCTION MACHINERY DIVISION
Southwest Welding & Manufacturing Co.
ALHAMBRA, CALIFORNIA

. . . for more details circle 257, page 16

Jaeger Spreaders, Finishers help set the Ohio Turnpike record

7280 ft. of 12 ft. slab in 13-hour day

Base course: First paver and Jaeger Spreader lay base ready for steel. Spreader's screw thoroughly reworks and compacts concrete against subgrade and forms. Strike-off leaves rough textured surface to receive mesh.

This Ohio Turnpike record, by V. N. Holderman & Sons, required perfect organization, scheduling and teamwork. Good equipment helped, too. On top course, for example, the oscillating screed of the Jaeger Spreader accurately metered the concrete between paver and finishing machines. In addition, both Jaeger Finishers were equipped with rear screeds diagonally adjustable for any pitch or super-elevation of the slab. For more data, see your Jaeger dealer or ask for catalog.

THE JAEGER MACHINE COMPANY

223 Dublin Avenue, Columbus 16, Ohio

AIR COMPRESSORS • LOADERS • PUMPS • CONCRETE MIXERS • TRUCK MIXERS

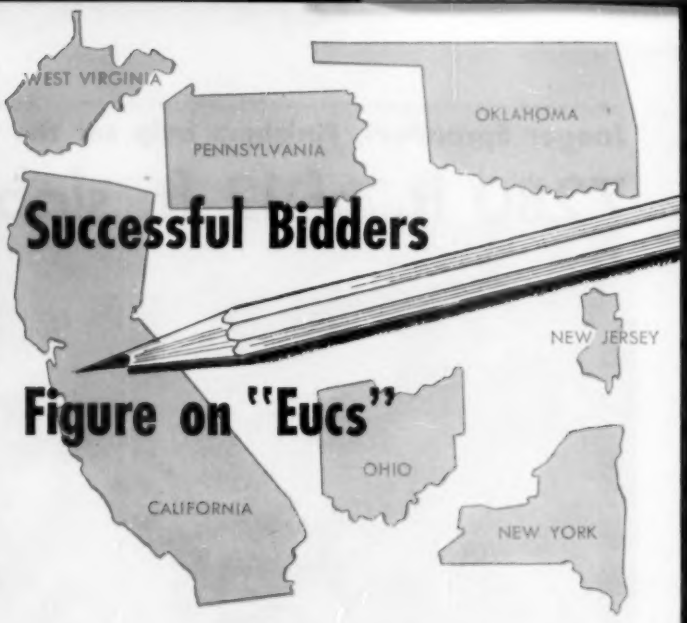
. . . for more details circle 202, page 16

NEW YORK THRUWAY—more than 500 "Eucs" of all types—Rear-Dumps, Scrapers, Bottom-Dumps and Loaders helped rush many sections of this 427 mile road to completion.

WEST VIRGINIA TURNPIKE—probably the most rugged test of equipment on all turnpikes to date because of the rocky, mountainous country. Of 275 off-highway rear-dump trucks used on the job, 260 of them were "Eucs".

CALIFORNIA—Euclid equipment has played an important part in building many of the modern super highways in the West. The "Euc" Scraper shown here is working on the Los Angeles Golden State Freeway.

OHIO—Bottom-Dumps and Euclid Loaders dominated the construction scene on the Ohio Turnpike. "Eucs" outnumbered all competitive rubber tired earth moving equipment by better than 4 to 1.



Successful Bidders Figure on "Eucs"

On almost every section of every turnpike project there's been mighty keen competition for the jobs—usually 10 or more bidders. When your competitors are using "Eucs" to move dirt or rock faster and cheaper, you just can't afford to pass up the cost-cutting advantages of Euclid equipment. That's why successful bidders on hundreds of earth moving projects base their estimates on the production performance of Euclids.

Money-making performance on all types of work is proved by the fact that over 60% of all Euclid equipment sold is repeat business from satisfied users.

FOR TOUGH ROCK JOBS...

and other heavy excavation, Rear-Dump "Eucs" are the logical choice as they were on the West Virginia Turnpike by more than 9 to 1. Capacities range from 10 to 50 tons with engines of 125 to 600 h.p., with some models equipped with Torqmatic Drive.

FOR BIG YARDAGE PRODUCTION...

the Loader and Bottom-Dump combination has no equal for high speed loading and hauling of earth and free flowing material. Bottom-Dumps have struck capacities of 13, 17 and 25 cu. yds. with loaded top speeds up to 35 m.p.h.

FOR SCRAPER JOBS...

big or small, there's a complete line with struck capacities of 7, 12, 15.5 and 18 cu. yds. High production and dependable job availability of "Euc" Scrapers has made them the fastest growing line in the industry. The "Twin Power" Scraper shown at the left has exceptional versatility—it's been a one-man earth moving spread on lots of jobs!

There are lots of reasons why the men who know equipment use "Eucs" but they all add up to this simple fact:

EUCS MOVE MORE LOADS PER HOUR AT THE LOWEST COST PER TON OR YARD

It's "Eucs" on the Indiana Turnpike now!

First contract on the Indiana Turnpike covering a 7.4 mile section was awarded to Rieth-Riley Construction Co. Grading is being done by Chapin & Chapin of Norwalk, Ohio—over a million cubic yards are to be moved. In the photograph, one of a fleet of 8 Euclid 15.5 cu. yd. Scrapers is shown working on an overpass northwest of South Bend.

Euclid equipment was used by most of the contractors who built our first super road — the Pennsylvania Turnpike — more than 15 years ago. Since that time "Eucs" have been the choice of contractors for grading work on just about every super-highway project from Maine to California.

The new Indiana Turnpike is no exception—Euclids will be used on nearly all of the grading contracts awarded to date. In fact, "Eucs" already outnumber competitive rubber tired equipment by a wide margin and many more will go to work when the job moves into high gear.

Men who bid these big jobs can't gamble on the selection of equipment — they have to play it safe with machines they can depend on to do the most work at the lowest overall cost. Even if you don't bid on these big projects, the same dependable low cost performance of "Eucs" can mean more profits — and more jobs — for you. Call your nearby Euclid dealer for help with any earth moving problems — he's at your service to help you make more money on every job.

"Eucs" paid off in performance on all of these toll road projects:

NEW YORK THRUWAY
PENNSYLVANIA TURNPIKE
NEW JERSEY TURNPIKE
MAINE TURNPIKE
OKLAHOMA (TURNER) TURNPIKE
WEST VIRGINIA TURNPIKE
OHIO TURNPIKE

and on other highway jobs all over the world.

EUCLID DIVISION

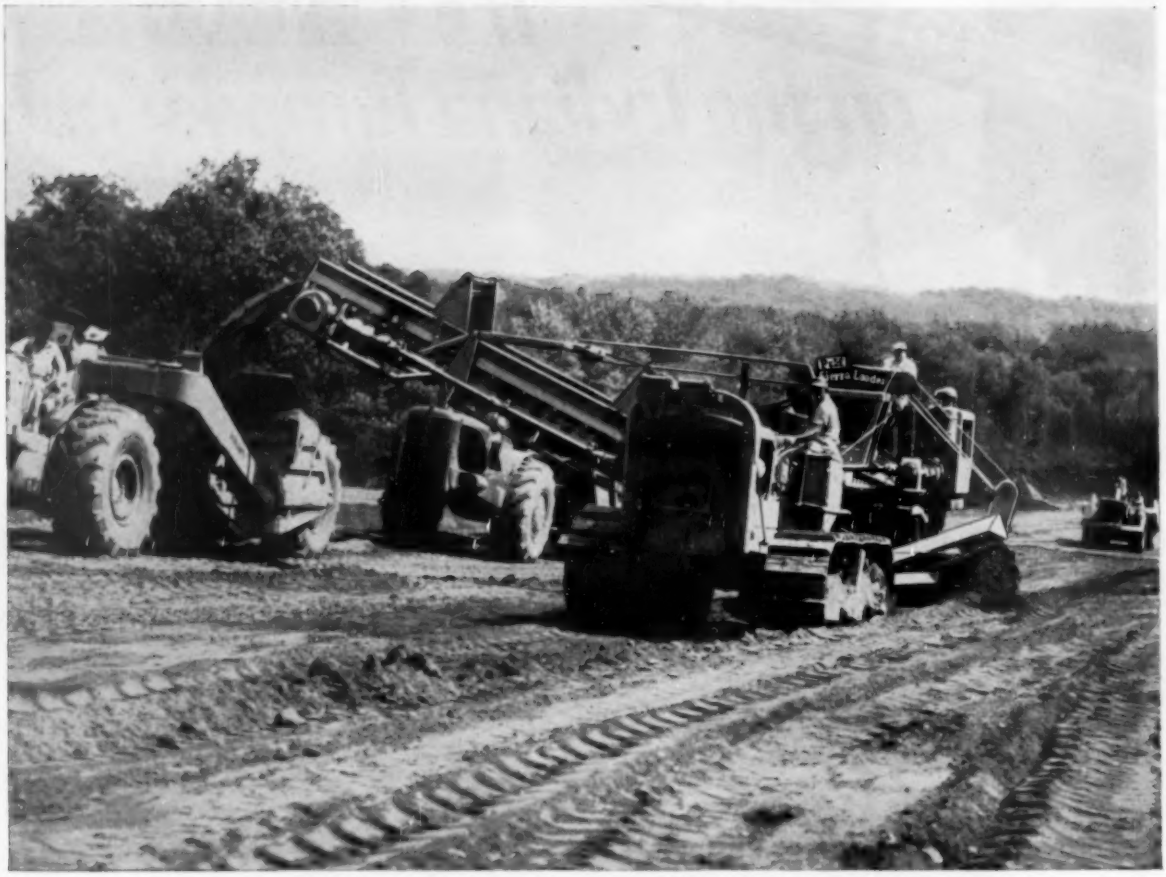
GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

GM GENERAL MOTORS

. . . for more details circle 190, page 16



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P&H Elevating Sierra Loader

You're looking at the newest thing in low-cost loading . . . and your P&H dealer has it! The P&H Elevating Sierra Loader puts loading on a modern "production line" basis . . . digging and conveying in a fast, continuous one-man operation. *Contractors report loading up to 1,200 cubic yards hourly!*

Its advantages are apparent

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- Built by P&H . . . Quality and Service Since 1884!

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Side view of Loader in operation.

P&H POWER CRANE AND SHOVEL DIVISION

HARNISCHFEGER CORPORATION

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the P&H *Line*

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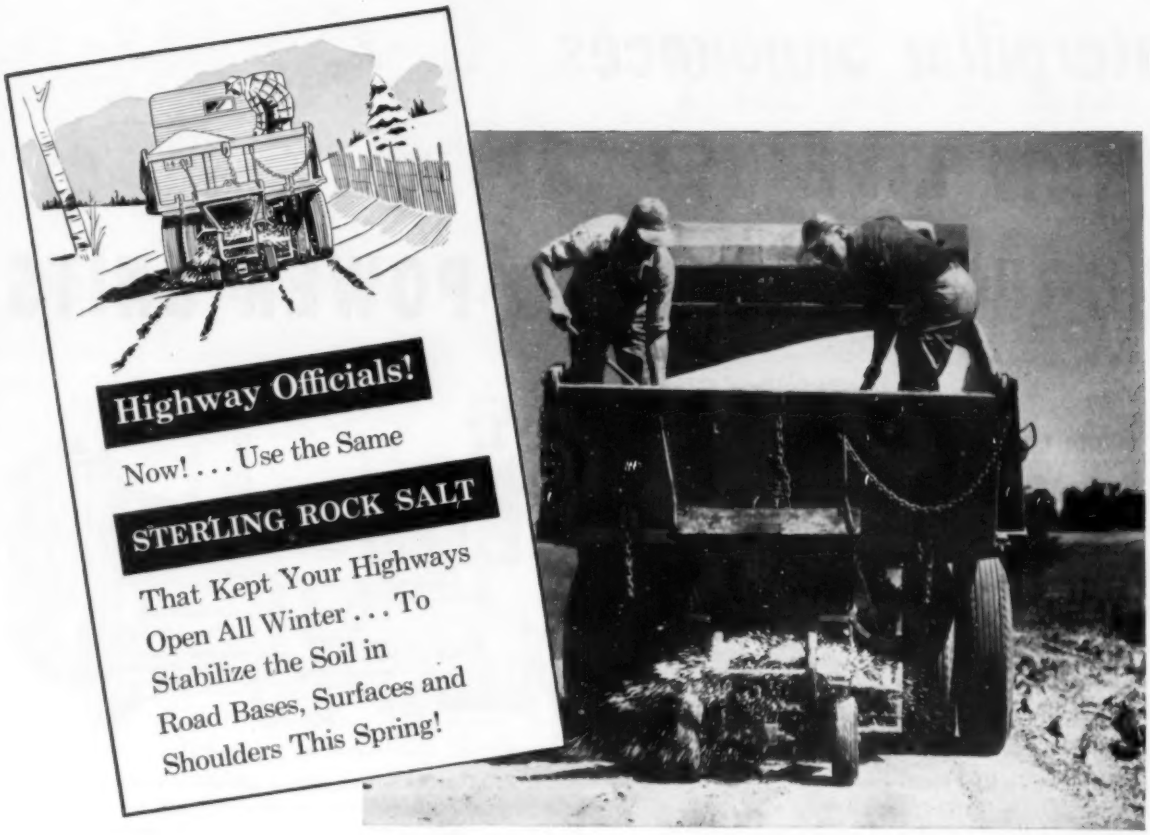
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Gravel roads . . . inexpensive to build and easy to maintain . . . become first class surfaces, smooth, permanent. Bases and shoulders of concrete or black-top highways do not "break up" or "separate" under weather extremes or the cruel beating of heavy trucks.

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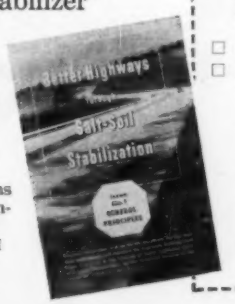

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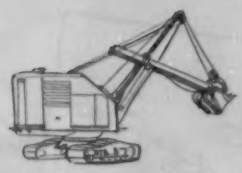
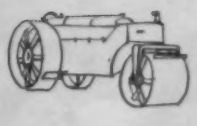
Caterpillar announces

A NEW LINE OF TORQUE CONVERTER POWER UNITS





WIDE CHOICE OF POWER UNITS

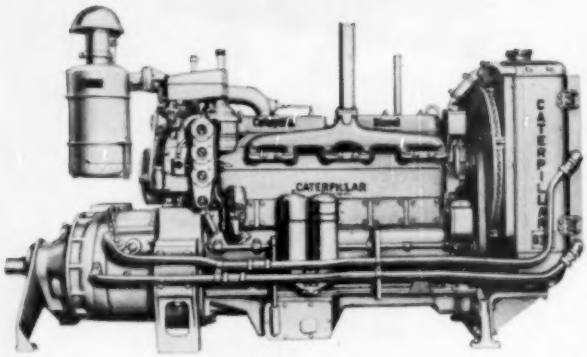
Engine and torque converter
Engine, clutch and torque converter
Engine, clutch, torque converter and reverse gear

WIDE CHOICE OF OUTPUT SHAFTS

Standard heavy-duty drive for side loads
Narrow chain housing for side loads
Wide chain housing for side loads
Output shaft for in-line loads only

Fast Facts About CAT* Torque Converter Power Units

1. Torque output is automatically matched to the load.
2. Loads start smoothly.
3. Load movement can be controlled without using the clutch.
4. Overloads cannot kill the engine.
5. Need no special hydraulic oil—their fluid is engine fuel—fluid level automatically maintained.
6. Cat Diesel Engine burns non-premium fuels cleanly and efficiently, even when idling.
7. Caterpillar can supply your torque converter requirements from stock.
8. Caterpillar Dealers have facilities and parts for servicing torque converters.



Now, to provide you with a greater selection of power packages, Caterpillar offers a new line of torque converter units. As many as twelve different torque converter arrangements are available for *each* of six Cat Engines, up to 480 HP. Whatever your power needs in excavators, cranes and other construction equipment, you'll find the right unit in Caterpillar's line.

In offering torque converter power, Caterpillar has combined extensive research with years of practical application in the field. Here are owners' reports of units on actual jobs: "Live and snappy with plenty of power" . . . "We get an abundance of power out of these torque converter power units."

Either as original or replacement power, it will pay you to check the advantages of torque-converter-equipped Cat Diesels. Each is matched to do *more* work at *lower* cost with *less* down time than any competitive unit. Leading manufacturers of construction machinery can supply these money-makers in the equipment they build.

For complete details about these production boosters, see your Caterpillar Dealer. He has the experience and technical knowledge to help you with your power problems. He has trained personnel who know how to install engines and torque converter power units in construction machines. Call him today!

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THE NEW STANDARD OF TORQUE CONVERTER POWER

. . . for more details circle 176, page 16

30-TON BOTTOM DUMP SEMI TRAILERS BUILT FOR

Both on and Off Highway Hauling

Designed to contractor's specifications, multi-tired units make good showing on California freeway project.

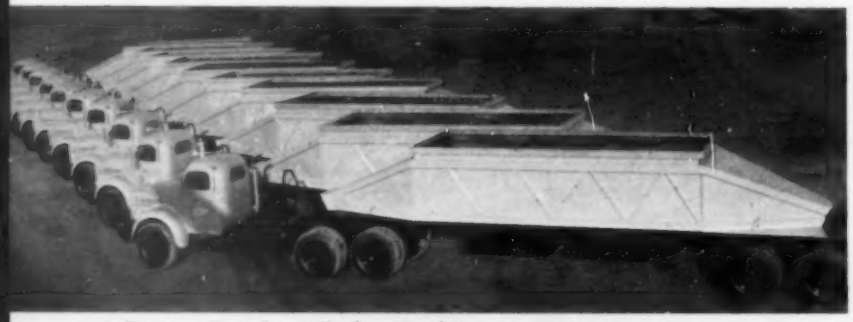
SOMETHING new in earth wagons made its appearance recently in the Los Angeles area, when Vinnell Constructors of Alhambra put 10 strange looking machines on its Harbor Freeway grading project near San Pedro. Built for Vinnell by Cook Brothers Equipment Company to the contractor's own specifications, the machines are designed for both off-road and legal highway hauling. The Cook firm expects to make the units as a production item for general highway and turnpike work.

The wagons consists of a 22.7 cu. yd. (water level capacity) bottom-dump semitrailer drawn by a Cook Bros. truck model JD64 powered by a Cummins JBS 600, 150-hp. diesel engine and Timken dual drive rear axles. The trailer is 35 ft. long and trailer plus tractor is 48 ft. long, out to out. Maximum width is 8 ft. These dimensions are within California state highway legal limits. The trailer's 24 yd. heaped load (30 to 33 tons or more) is carried on eight pairs of truck tires, also specifically selected by the contractor. Tires consist of Firestone 1000 x 20, 14-ply nylon

● A 33-ton maximum payload — on over-the-road truck tires — is a recent California innovation. (ROADS AND STREETS staff photo, November, 1954.)

● Two pairs of specially designed air gates drop the load in a windrow narrow enough for good straddling.

● Another view of one of Vinnell's 35-ft. Cook-built rigs, being drawn by a Cook tractor with Cummins engine and loaded by a Caterpillar D8 drawn P&H Sierra loader. This combination was good for 1,000 cu. yd. or more per hour in sandy-clay soil.



● Ten new "long boys" lined up for delivery to Vinnell Constructors.

all-traction logger tires built for combined speed and heavy road service. The specially designed dumping gates are individually operated by air from the truck motor and controlled from the cab.

Origin of the machines was by Cook Bros. Engineering Department from information obtained from Jack Yount, now vice-president of Vinnell Constructors, and others on southern California highway projects. The truck tractor specifications also included a Fuller transmission and divider gear boxes and Budd wheels.

"We specified the above components," said Yount, "because of past experience in heavy highway earthmoving, having used them very successfully and at low maintenance cost."

The trailer axles have full air brakes with foot and hand controls in the cab.

The tractor and trailer weigh 28,800 lb. empty. The unit can sail down the arterials in the Los Angeles area, to and from borrow and disposal sites, with a 21½ ton maximum pay-load, without special permit, under the state highway legal load formula for dual-axled semi's. Maximum road speed is 50 mph.

This equipment was given its first real workout on Vinnell's 1954 grading contract on a section of Harbor Freeway south of Los Angeles. During a typical 8-hour day, when the accompanying pictures were taken, 7 wagons working with a P&H Sierra loader and a Caterpillar D8 tractor, moved 7,000 cu. yd. of earth on 8,000 to 10,000 ft. round trip haul. The number of hauling units in operation was varied from day to day depending on haul distance, to keep pace with the loader, which could easily handle about 800 cu. yd. per hour in the sandy-clay soil encountered.

1,000 yd. Per Hour

Since the day of these pictures, the cut has been lowered, giving considerable more loading length for P&H Sierra loader, which in turn required putting on one more haul unit. This increased production to between 400 and 425 loads per day. At 20 pay-yards per tractor unit, the yardage moved by the trucks and P&H Sierra loader has averaged from 8,000 to 8,500 per 8-hour shift without overtime.

Other equipment working in conjuction included 5 additional D8's, a heavy ripper, 2 sheepsfoot roller units, and a Mack 3,000 gal. sprinkler truck. A Southwest 75-ton rubber-tired compactor was placed on the job as work progressed.

● Snapped on the Harbor Freeway job: Haig Ayanian, construction engineer, and F. E. Sturgeon, resident engineer, California Division of Highways; Glen McAfee, general superintendent, and Jack Yount, general manager, Vinnell Constructors.

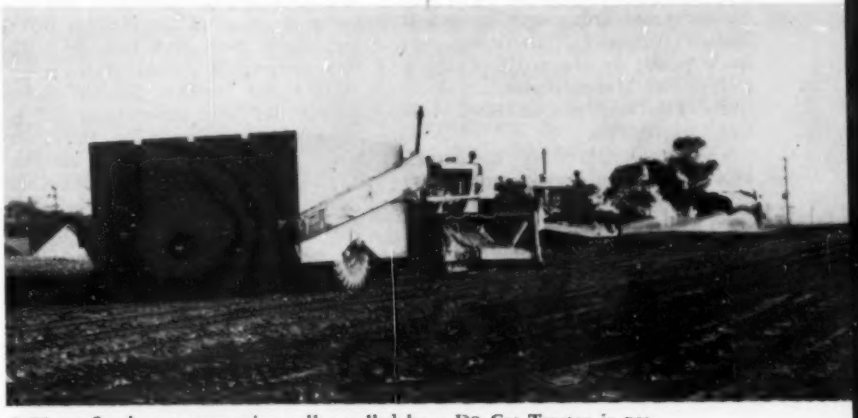
The big 35 ft. semi's represent an evolution from an earlier, shorter wheel base model. These earlier trailers, having dual truck tires on single axles, carried a legal load of 12 tons each and were hooked up two to a tractor. This combination of equipment, among other jobs, was used by Atlantic Constructors for delivering borrow on a section of the Long Beach Freeway in 1953 (see photo).

Bulldozer pusher service was occasionally required to help the tandem outfit dump its load and get going again in soft sandy soil, but the wagons made hauls up to 10 miles with a good cycle time due to good over-the-road characteristics. They are still working in the Los Angeles area.

From the experience with the earlier, smaller wagons, the value was seen for a single trailer of greater off-highway capacities. The earlier experience also resulted in certain mechanical improvements including refinements in the dumping gate mechanism, now embodied in the longer dual axled machines. The new semi's require no dumping assistance, thanks to the added traction of the dual drive and the new design. Mr. Yount expects the new 30-tonner to largely replace the shorter semi's for southern California work.

In charge of the Harbor Freeway project for Vinnell Constructors is Glen McAfee, general superintendent; J. O. Sheldon, grading superintendent; and Murray Posner, engineer.

● Earlier 24-ton, single-axle models being used in tandem on a Los Angeles freeway project in 1953, United Concrete Pipe Corp., and Ralph A. Bell, contractor.



● 75-ton Southwest compaction roller pulled by a D8 Cat Tractor is preceded by sprinkler tank truck on the Harbor Freeway project.

Pier surface restored by cement gun method

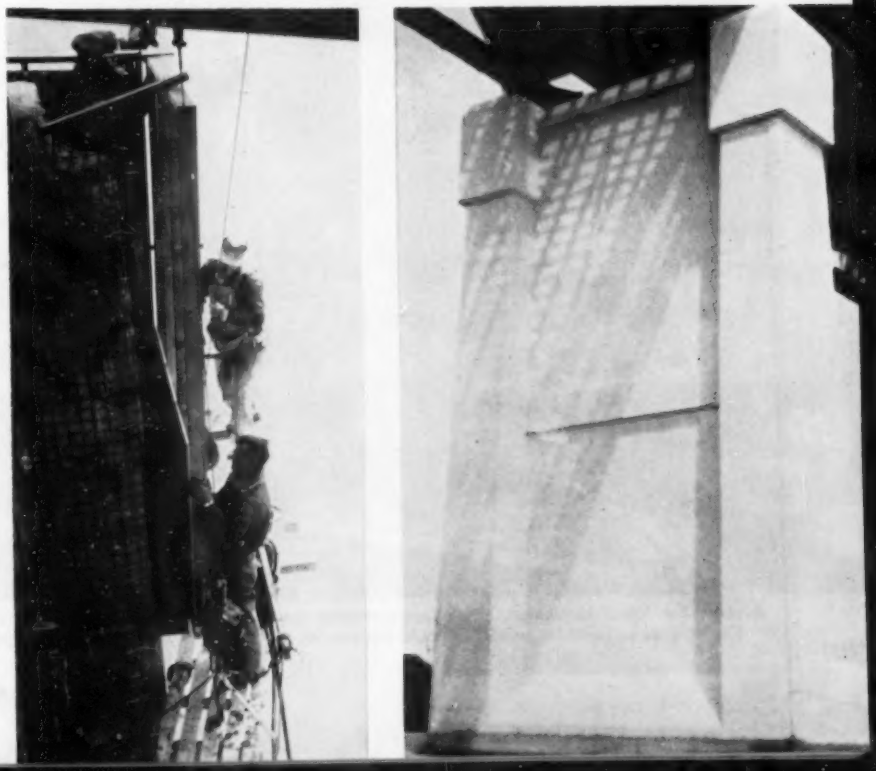
An example of restoration of weathered concrete areas on a river bridge pier is the repair work recently completed on MacArthur bridge over the Mississippi River at Burlington, Iowa. Western Waterproofing Co. of St. Louis through its Kansas City regional office was the contractor.

The first step was the usual one of cutting out all disintegrated concrete areas down to sound concrete. The pier caps which were in poor condition were completely removed. All affected areas were then cleaned, properly reinforced, and re-filled with gun-applied portland cement mixture.

Completely new pier caps were designed, involving welded mesh reinforcing steel anchored in place. All restored pier areas were given two coats of "Resto-Crete," a portland cement base compound. All the work was done from a floating barge to avoid bridge traffic interruption.

The project was directed by Harry Staff, commissioner of streets and public improvements, Burlington, Iowa.

● Workers on scaffold positioning forms for rebuilding pier cap for MacArthur bridge. Shown here also is the restored pier.



Roads and Streets in the News

$577 Million Bridge and Expressway Program for New York Area

The New York City-New Jersey metropolitan area, scene of the world's worst traffic problem, has been given a bold prescription. A 5-year program of bridge and approach construction totaling $379 million, with another $198 million for connecting expressways, has been recommended after a joint study by the Port of New York Authority and Triborough Bridge and Tunnel Authority. The study was made public by Howard S. Cullman and Robert Moses, chairmen respectively of the two agencies after a year-long investigation.

The rapidly growing residential, business and industrial communities in Northern New Jersey counties, Long Island and Westchester demand arterial highway communications with each other and with the Boroughs of New York City. At the same time, it is imperative that trans-metropolitan vehicular traffic be served by trans-Hudson, Upper New York Bay and East River facilities that will permit this through traffic to move north or south of Manhattan's congested area, or be carried across the island by express routes.

In 1954 nearly 76,300,000 vehicles, almost double the prewar volume, crossed the Hudson River. An additional 4,000,000 vehicles crossed Upper New York Bay by ferry. Traffic estimates indicate that as early as 1960 a total of 105,000,000 vehicles, an increase of 30 per cent over last year's volume of 80,300,000, will demand crossings of the Hudson River and Upper New York Bay. By 1975 this demand is estimated to reach 180,000,000 vehicles. Similar traffic growth has been experienced and is expected to continue on the East River crossings, particularly on the Triborough and Bronx-Whitestone Bridges which in 1954 handled 64,000,000 vehicles.

The recommended program therefore includes a $204,000,000 12-lane double-deck suspension Narrows Bridge, connecting Fort Hamilton in Brooklyn and Fort Wadsworth in Staten Island; an $82,000,000 6-lane lower deck of the George Washington Bridge, and a $93,000,000 6-lane single-deck suspension Throgs Neck Bridge connecting Cryders Point in Queens and Fort Schuyler, Bronx.

The Joint Report also recommends the construction of extensive connecting highways beyond the immediate approaches to the proposed bridge projects. Such highways would cost about $198,000,000. They would require financing from sources such as Federal and State funds since they could not be provided on a self-supporting basis. Construction of these connecting highways must be coordinated with the construction timetable of the bridge projects.

If the necessary Federal, State and local approvals are granted without delay, the bridge projects will be available to traffic by January 1, 1960.

Credit to ARBA

In last month's ROADS AND STREETS, the article, "Planning and Design Problems for a $101 Billion Road Program," pages 48-49, reported the findings of Task Force No. 1, but the Editors failed to make it clear that this work was part of the American Road Builders' Association's industry report to the President's Highway Advisory Committee.

The sections by Task Forces 2, 3 and 4 on materials, contracting and manufacturing capacity were reviewed in January ROADS AND STREETS.—Editors.

● (Left): A lower Manhattan crosstown expressway would also be built as pictured here. (Right): Narrows Bridge for NYC as pictured by artists. It would indicate world's largest span (4,400 ft.), unprecedented approach design.

Missouri Has 10 Year Program

By Rex M. Whitton

Chief Engineer, Missouri State Highway Department, Jefferson City

The Missouri State Highway Commission launched a 10-year highway modernization and expansion program on July 1, 1952 with an estimated $557.5 million spent to meet minimum needs of the state's highway system. The program was made possible by a one cent increase in gasoline and diesel fuel taxes (total tax three cents per gallon) and an increase in bus and truck fees.

Tentative goals anticipate these expenditures: $297.5 millions to modernize existing major system highways; $142 millions for urban improvements and $118 millions to expand and improve the supplementary (farm-to-market) roads which includes the addition of 12,000 miles.

During the first two fiscal years, improvements on 4744 miles of state highways at a cost of $99,209,604 had been made or authorized. Improved were 851 miles of major system highways, 1895 miles of supplementary roads and 1998 miles of existing local roads (which the Commission had taken over for maintenance as temporary state roads pending their eventual development to supplementary road standards).

For the first six months of this fiscal year, the Commission has authorized or contracted improvements on about 1243 miles, (cost, about $30 millions): 265 miles on major system highways, 523 on supplementary roads, and 455 of former local roads temporarily maintained.

Of the remaining month's of this fiscal year an additional $35 millions is anticipated, bringing the year's total to $65 millions. On a calendar year basis, it is expected some $65 millions in improvements will be achieved during 1955. Any stepped-up federal program will boost this estimate higher.

Maintenance expenditures were at an all-time high during 1954 with a budget of $16,550,000. It may be 10 per cent higher for 1955 due in part to mileage increases.

One of the major problems the Missouri Commission faces is obtaining necessary technical personnel. Although the department is well-known for long tenure of employees (570 now have 25-year veteran status), the Commission is hampered by competition for such personnel from other highway departments and industry.

Missouri's General Assembly convened this January; at present there is no indication of any legislation affecting the 10-year highway program. A legislative committee during the past year has made a detailed study of the state's Local Roads problem and may submit recommendations to the Assembly on ways and means of added improvements. Since any monies for such work would come from existing general state revenues, no affect is expected on state road fund.

Midwest PreCote wins worker safety award

Midwest PreCote Company, Kansas City, Missouri, won first place in the highway division Group A in the national safety contest of the Associated General Contractors in 1954.

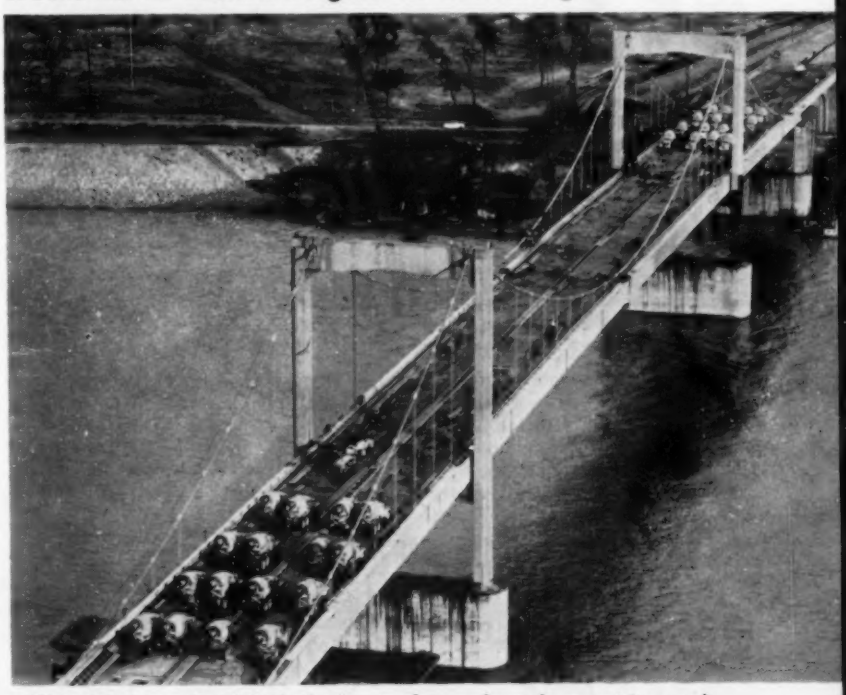
During the year ending September 30, 1954, the company had only five accidents involving 39 man-days of lost time in a total of 468,000 man-hours and labor operations. This is a frequency rate of 10.7 with a severity rate of 0.08. A. A. Strane of the Midwest PreCote Company will receive a bronze plaque at the annual AGC meeting in New Orleans, March 16.

New traffic, safety records on Jersey pike

Records fell on the New Jersey turnpike in 1954, new peaks being established in traffic, revenue and safety. In the turnpike commission's annual report to the Governor and Legislature the following points are noteworthy:

- A daily average of 67,687 vehicles used the turnpike — 24,700,000 for the year. (Original estimate for 1954 was 27,700 daily.) This was an 11.6% increase over 1953, and represents 1981 predicted traffic.
- A new low in traffic accident rates was set. Fatality rate for the year was 2.47 per 100 million vehicle miles. Accident rate was 59.2, or one-seventh of the rate on New Jersey's public highways.
- Toll collections for the year were $20,785,000, also decades ahead of the predicted growth.
- Progress was made in construction of the Newark Bay-Hudson County extension and the connector with the Pennsylvania turnpike.
- Plans were begun for widening the northern section to 6 lanes.

Trucks act as counterweights for new bridge



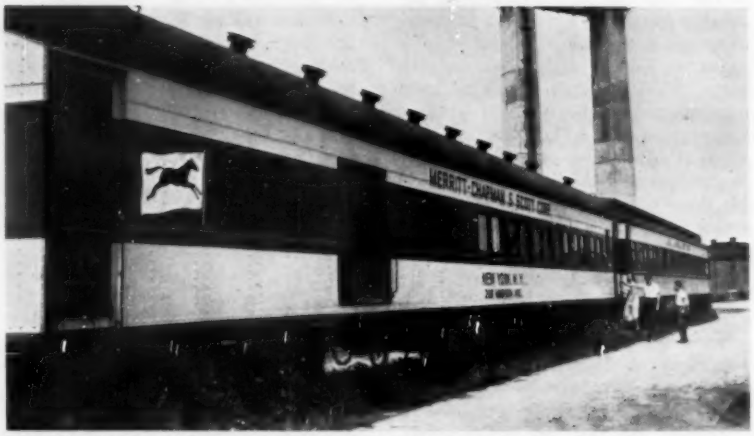
● Thirty-two International 6-wheel mixer trucks are shown here — 16 on each anchor span — serving as counterweights in the final setting of steel for the new $18 million Paseo bridge over the Missouri at Kansas City, Mo. The purpose was to raise the center span by thus stressing the anchor spans, in order to effect a final plate connection and proper stressing in the stiffening trusses.

Converted Pullmans for Field Offices

TWO converted Pullman cars will be used in the next three years as headquarters of Merritt-Chapman & Scott Corporation, contractors on the 4-mile tunnel-bridge across Hampton Roads near Norfolk, Virginia.

Construction Man's "Dream"

The rolling offices are said to be a construction man's dream come true in the way of field offices, since they are spacious, can be picked up and moved from one job to another, or even at different locations near any one large project. The cars are initially located about five miles from the project site, on a rail siding. The location is near one of the piers to be used in building a "shape-up" station.



● Field office on rails, now assigned to M-C&S's traffic tunnel job at Norfolk.

● Plenty of space makes for efficiency in field office management.

Facilities in the first car include the project manager's office, with adjoining bedroom and bath for nights he must spend on the job; quarters for the office manager and bookkeeper; supply room, receptionist-secretary's office and a ladies lounge. The other car houses offices for the project engineer and his assistants, purchasing agent and chief timekeeper, plus a file room and lavatory.

Tunnel-Bridge Job

There are 23 steel tube sections involved in the 6,860-ft. underwater portion of the tunnel.

The $45 million job will be under project manager Robert I. Senn who will report to Charles A. Richardson, vice-president in charge of Merritt-Chapman & Scott's New York Marine and Heavy Construction Division.

Research launched on urban transportation problem

A program to develop basic data for solving traffic congestion, to improve street conditions, and to better mass transportation services in cities of all sizes throughout the country, has begun under auspices of a new National Committee on Urban Transportation.

This program is the first concerted, nation-wide effort of its kind. It is aimed at helping cities get the facts needed to properly determine the deficiencies of urban transportation systems, to plan realistic programs to overcome these deficiencies, and to present clear statements of needs to legislative bodies and the public.

The committee formed early in 1954 stems from six national organizations: the American Municipal Association, American Public Works Association, American Society of Planning Officials, International City Managers' Association, Municipal Finance Officers Association and National Institute of Municipal Law Officers.

Glenn Richards, Commissioner of Public Works in Detroit, Michigan, is Chairman of the National Committee, and Norman Kennedy, of the California Institute of Transportation and Traffic Engineering is Committee Staff Director.

Nine subcommittees have been established and assigned various phases. In the next six months these groups will determine the kind of data that should be collected by cities. The Committee then will draft manuals setting forth the most promising procedures for collecting such information. These procedures will be tested and evaluated through pilot studies in selected cities. Procedures then will be reviewed and refined in the light of the findings from these pilot studies. Final step will be issuance of manuals which will show cities how to carry out data-collecting procedures on a uniform and continuing basis.

These manuals should outline for cities — regardless of their size — the way to get to the heart of their transportation problems.

Editorial

Premium on Sound Contractor Management

Much has been said and heard recently about the "wild" bidding of road contractors. The roadbuilding fraternity indeed has been in the midst of a price war as well as a boom. As always happens in such wars, a lot of people are hurt beside the ones who cause the trouble.

Today 13 contractors on an average are bidding on each road job over $100,000, where there used to be only six. It is said that the fellow who gets the work is the one who makes the most figuring mistakes and leaves out the most items.

Just to name a few examples of bid trends — *in a time of firm or rising wages and material prices* — contractors who took jobs during 1954 Autumn lettings on the Indiana Toll Road bid an average 27% under the engineers' estimates. "A net saving in construction cost of $26 million," boasted the toll road commission in its annual report.

A feature article in the *New York Times* quoted a dozen similar examples of downward prices, from interviews with contractors attending the ARBA convention at New Orleans. The 1954 prices at which these contractors took jobs varied from 10% to 30% under the estimates. Don White of American Asphalt Paving Co., Chicago, for example, reported his dollar volume off 20% in 1954, and 30% off from the firm's 1952 record business.

• In Ohio, planners of the proposed 420-mile Ohio Turnpike No. 2, which will run diagonally north from Cincinnati, are counting on a saving of 20% over original cost estimates, due to competition.

What is happening, notes Nello L. Teer, Jr., of the North Carolina roadbuilding firm, is that contractors often have eliminated or drastically reduced their provisions for contingencies, such as weather, in computing bids. "By eliminating such contingencies, the contractor takes a risk," observed Teer, "and he frequently guesses wrong."

What is the reason for this tight competition? In a broad sense, it simply means that the American system of free enterprise is doing its stuff in a period of adjustment.

More productive and efficient equipment has enabled existing contractors to increase their capacity. Contractors in other fields, seeing the big road boom, have jumped into this work. New companies are forming. A tapering off of military and certain other governmental construction recently has also been a factor.

Another cause is one that contractors can possibly do something about, if they will. That is the one underscored by John MacLeod, President of AGC, in a forthright talk before the Associated Equipment Distributors meeting in Chicago recently. Shoestring financing and long-term credit extended to contractors by some distributors, has been a factor in setting up unqualified people as contractors or in spurring others to jump hastily into roadbuilding without sufficient experience. These fellows often don't know their costs, and their low bids sometimes force the successful companies to live on dwindling surpluses to keep in the running.

• Contractors who hear of unsound business methods could boycott distributors and other agencies involved. This might help the situation somewhat but the well-managed road contractor will weather competition, and emerge stronger than ever — as well he must if he is to help give the public its money's worth in the huge road program ahead. Sound companies with highly developed and skillful organizations — small and medium as well as large — must be available to implement road work, which even now in 1955 ranks among the Nation's great industries.

Contractor management to come to the point here, is based on many things, but none so basic as sound estimating and cost keeping. The large size and growing complexity of projects make this all the more true.

Better training of estimators and project managers, and better understanding and application of cost keeping principles and methods, are getting attention today. One illustration of the new attention to job management is the Michigan Road Builders Association program of pre-season short courses for member personnel — started as safety training and broadened to cover general aspects of job performance.

• The well-run firms today are bidding carefully, with a cost knowledge of what they are getting into and not rushing to take work always just to get it. They know that rash bidders will soon fold, and that there is plenty of highway work ahead in the long run. The leaders are chiefly concerned with improving their organizational efficiency and with assembling the best possible equipment, so that they can continue to reduce costs. The watchword of progressive contractors and their associations is to give an ever larger money's worth for the highway construction dollar.

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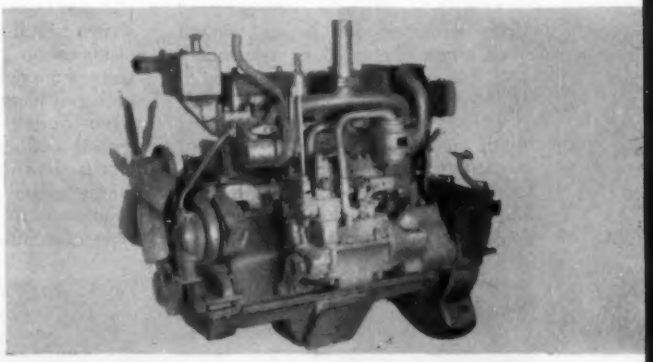

New 128-HP Engine features improved fuel injection system, flanged center main bearing to take crankshaft thrust, many other advances.

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ADVANCE BORINGS FOR SOILS DATA

How the highway departments are obtaining and utilizing better sub-surface soil and rock data for purposes of location, design, estimating and construction plans preparation.

I—Maryland Supplies Extensive Data

By J. Eldridge Wood

Chief, Bureau of Soils and Materials, Maryland State Roads Commission, Baltimore 3, Md.

First in a series of informal summaries supplied by letter in response to a query by the ROADS AND STREETS' *editors.*

THE accompanying "Soil Survey General Procedure" outlines Maryland's fieldwork and planning on advance soil studies. Particular attention is directed to the "hatching system" of soil identification developed and used by the State Roads Commission and which has found wide spread favor with state and federal highway authorities.

Borings are made to obtain disturbed soil samples for classification tests. The equipment currently used by our department is both hand and power (see photographs) consisting of the following types:

(1) B-36 Mobile jeep-mounted drills equipped for power take-off with augar flights, 5 ft. per length and 6-in. diameter, as manufactured by Mobile Drilling, Inc.

(2) McCulloch gasoline powered earth augers, with drill flights 4 ft. per length by 4-in. diameter.

(3) Iwan and Acker hand earth augers of 2, 4, 6 and 10 in. diameter.

All data obtained from field boring records, and laboratory classification studies are plotted on the project plans and the information thus made available to contractors.

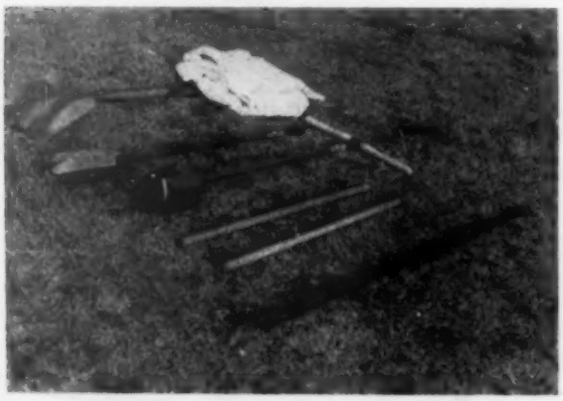
"Hatching" System

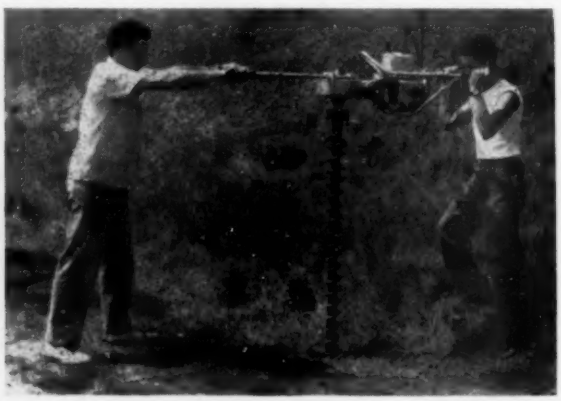
Although, no attempt is made to plot soil horizons, each field boring is shown to full depth on the plans with classification given by means of the aforementioned "hatching" system of each soil plotted as to depth encountered during the boring. The soil legend defining the "hatching" system is shown on the plans. Depth of boring refusal and depth of water encountered are noted on the plan. The type of refusal is noted and in the case of rock, opinions are expressed on the plans as to type of rock, origin, physical condition (decomposed, solid, boulders etc.) and probable necessary method of removal such as power shovel or blasting all as determined visually, by testing and by locality experience.

All other information noted under "Soil Survey General Procedure" such as depth of swamp muck, top soil and root mat, etc., is shown on the plans and volumes per Station given in Earthwork quantities on the Summary of Quantity sheet which is a part of the plans.

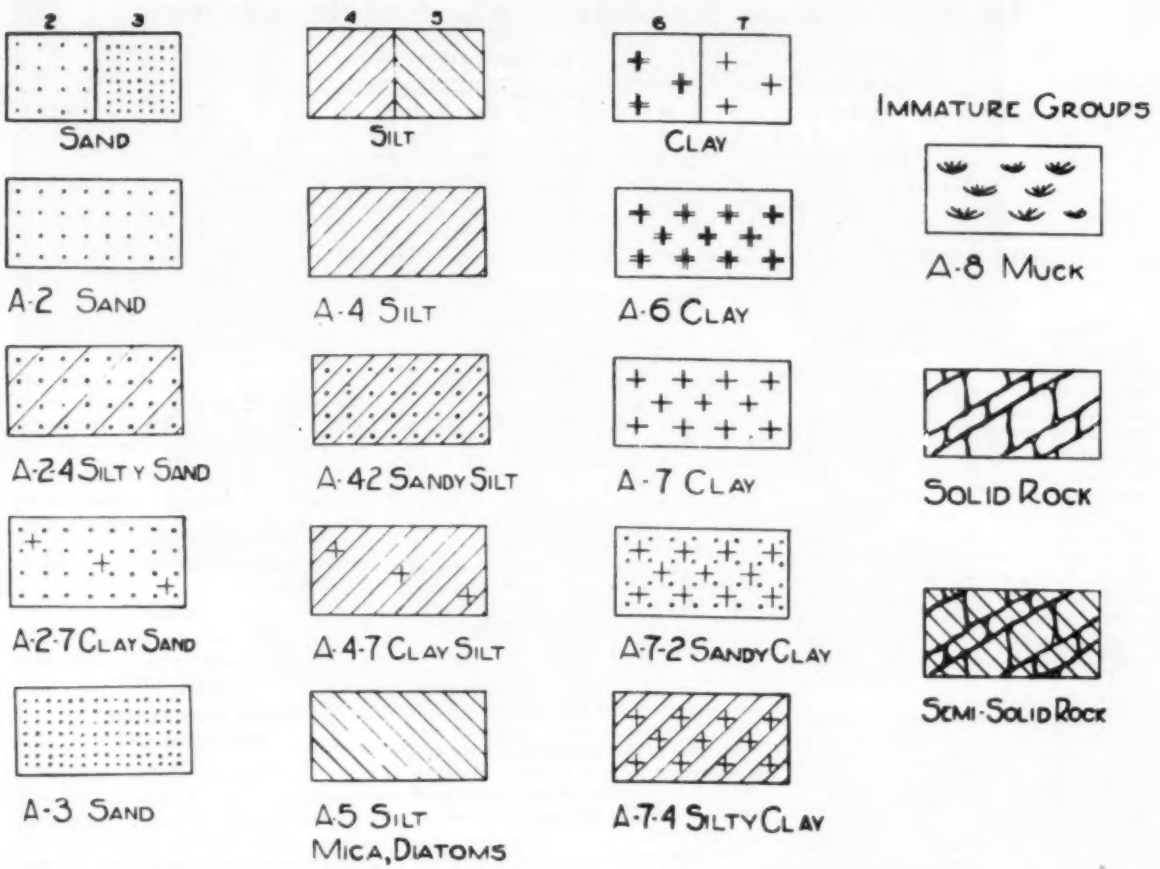
A General Note is made a part of the plans denoting that soil borings have been carefully made, but no guarantee is made for their accuracy. In the Special Provision governing the project, the following reference is made:

"Cut and fill quantities are indicated in the 'Summary of Quantities' on the Plans, together with sufficient detailed information to permit the most economical handling of earthwork quantities. It must be understood, however, that although such cut and fill quantities were computed from information obtained by preliminary surveys, soil borings, inspections and earthwork studies, such quantities are subject to change due to the various types of materials en-





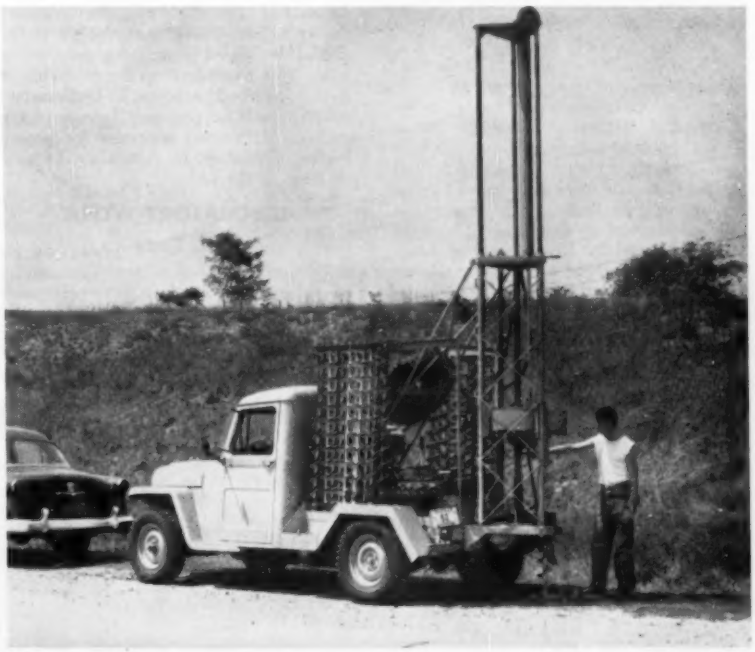
● (Left): Iwan and Acker hand earth augers of various diameters. (Right): Maryland department's McCulloch gasoline-powered 4-in. auger.



● Hatching legends used on Maryland's road construction plans to indicate surface data found from borings.

countered, shrinkage, type of equipment used on the project, and the method of handling. The soil borings and classifications as shown on the Plans were obtained from the best available sources. The Commission, however, will not accept responsibility for the accuracy of this information, and the contractor shall take this into consideration in submitting his bid. No additional compensation will be allowed due to changes in character, or amounts, of material encountered.

"It shall be the obligation of the contractor to utilize all suitable material from cuts in the construction of fills throughout the entire length of the project. No 'borrow excavation' will be permitted to be used in the fills of the project until provisions have been made for utilizing all available, suitable, excavated materials."



● Maryland's Jeep-mounted "Mobile" drill unit with 6-in. auger.

Soil Survey General Procedure for Maryland Highway Work

Author's Note: It is recognized that the following General Procedure is in the form of a directive for distribution to our own working staff. We ask the indulgence of the reader in this respect and request that it not be considered the only practical method or even the most accurate procedure. The purpose of its inclusion is to familiarize the reader with the method used by Maryland. By no means should it be construed as a criterion for other agencies having similar problems.

FIELD WORK

A. Borings

1. Spacing. All borings will be at an approximate spacing of 300 ft. on the right, left, or centerline of the project in both cut and fill areas. Intermediate borings shall be made if subsurface conditions are so non-uniform that additional information is needed to assure a full knowledge of the prevailing materials for proper utilization of the earthwork items.

2. Depth. In cut areas all borings will be made to a depth of at least 3 ft. below the design subgrade of the highway. In fill areas boring will be made to a depth of 3 ft. below the original surface of the ground. In addition, one or more borings in each fill area will be made in depths from the original surface of the ground equal to the height of the fill above the surface of the ground.

3. Swamp Areas. In swampy or marshy areas where material will obviously have to be removed or displaced, one boring will be made if possible to determine true subsurface conditions. In addition, the extent and depth of easily penetrated muck will be determined by the method of probing. The probing will be conducted on the centerline and also to the right and left to the edge of the embankment. The depth of water will be recorded and the date, since depth of water often varies with the season.

From an examination of the field conditions, a recommendation will be made as to which method of muck removal — mechanical, explosive, or displacement — will be most practical.

4. Rock. If evidence of rock or refusal is found in any boring, then additional borings will be made in the immediate area to attempt to determine if the refusal is caused by large gravel or boulders. In cases where continued evidence of rock areas are found, and if deemed necessary, core drilling or other exploration methods will be employed.

5. Water. Samples of water will be taken from streams, ditches, boring holes, etc., and tested for determination of the necessity for culverts being resistant to contamination encountered.

6. Additional Field Work. In addition to making the borings, and procuring samples, all pertient features shall be recorded such as:

a. Rock outcrops along the right-of-way.

b. Refuse dumps, cinder piles and all materials not laid down by nature or areas disturbed by utilities, construction, etc.

c. Marshy and swampy areas.

d. Depth of top soil available for stock piling and spreading on slopes to promote growth of vegetation.

e. Depth of root-mat which will require grubbing.

f. Water table: Where the boring penetrates below the water table, the boring shall be left open for 24 hours and at the end of that period the depth to the surface of the water table below the surface of the ground shall be measured, exactly located and recorded.

7. Samples (General). Samples will be taken of material from each individual soil strata encountered. For the routine laboratory tests so-called disturbed samples shall be taken. Such samples may be obtained by post hole auger, mechanical auger, or any other convenient method, provided that the gradations and physical properties of the sample be representative of the gradation and physical properties of the soil in place. The samples will be of sufficient size to enable all routine AASHO—PRA or HRB tests to be performed.

The samples as obtained will be put in sacks, tagged and shipped to the laboratory as soon as possible. Moisture samples shall be taken of cut material where indications are that moisture contents are excessive. These samples are to be placed in sealed containers suitable to retain field conditions.

(Undisturbed samples.) Undisturbed samples shall be procured by acceptable methods if deemed necessary for testing in the laboratory to determine bearing capacity of the soil.

LABORATORY WORK

A. Tests

1. Routine classifications. The routine laboratory tests which will be performed are:

a. Complete gradation from the 2½-in. sieve down to clay size using sieves and the mechanical analysis-hydrometer method.

b. Field moisture equivalent.

c. Liquid limit.

d. Plastic limit.

e. Plasticity index.

f. Shrinkage limit.

g. Standard moisture-density relations of soil (Proctor Compaction Test).

All tests will be run according to the latest AASHO test methods, and in addition, other characteristics specified in the following shall be determined. The Standard Moisture Density test shall be run on selected samples representative of soils in cut areas, such samples being selected to show the range in fill materials for incorporation on the Typical Curve Chart.

2. California Bearing Ratio Test will be conducted on selected samples to establish bearing values on all representative soil types encountered on the project.

B. Soil Classification

From the information obtained in the tests, the soil will be classified according to the Maryland modification of the Public Roads Administration Classification system (1942).

C. Samples

Soil samples will be retained in the event of required rechecks until final approval of the test reports.

PLAN AND REPORT PREPARATION

A. Mapping of Soil Plans

All data obtained from field boring records, laboratory tests, classification studies, etc., shall be plotted on the project plans adhering to the attached hatching system of soil identification as used by the Maryland State Roads Commission.

B. Letter of Recommendation

All design recommendations for the proper utilization of the native material shall be made in a letter of recommendation to assist in the final preparation of plans and Special Provisions. The letter shall include information and recommendations as to the following.

1. Predominant soil types encountered.

2. Borings made to refusal with data on materials encountered and recommendations as to removal or further exploration.

3. Ground water encountered giving the exact horizontal and vertical location with provision for controlling.

4. Water sample tests with recommendation or pipe.

5. Borrow and gravel requirements.

6. Subgrade treatment.

7. Muck locations, depth and recommendations for removal or consolidation.

8. Pavement cross-section recommendations and specifications.

9. All other information necessary for the project design dependent on soil criteria.

(Continued on page 58)

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USES VICKERS® HYDRAULICS for STEERING and DUMPING

Dart Model 60 Truck is shown carrying full 75-ton payload.

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REPRESENTATIVE STANDARD VICKERS UNITS USED ON DART MODEL 60

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

. . . for more details circle 261, page 16

II—Virginia's Modern Boring Methods

By A. B. Cornthwaite

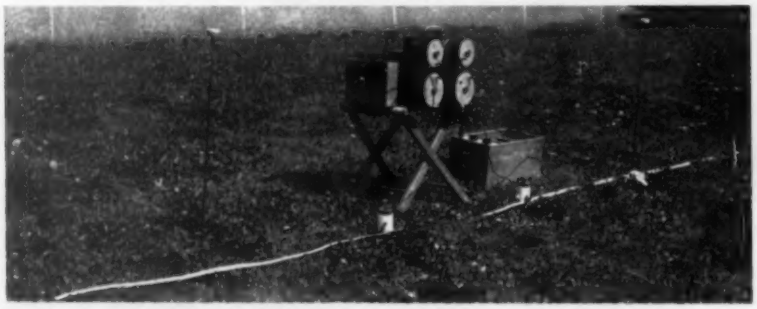
Testing Engineer, Virginia Department of Highways, Richmond, Va.

THE Virginia Department of Highways makes extensive use of soil and rock studies prior to the advertising of final plans for any project. For this purpose, we have a soils engineer and his staff together with a geologist and his staff operating from the Central Office Laboratory located in Richmond. Supplementing their activities are district materials engineers in each of our eight construction districts who have soil boring augers mounted on jeeps.

In execution of the soil and rock study program, plans of the proposed project generally at the field inspection stage are submitted to our soils engineer on a preliminary roll showing the ground elevation and a tentative grade. Along with these plans a completion priority is indicated:

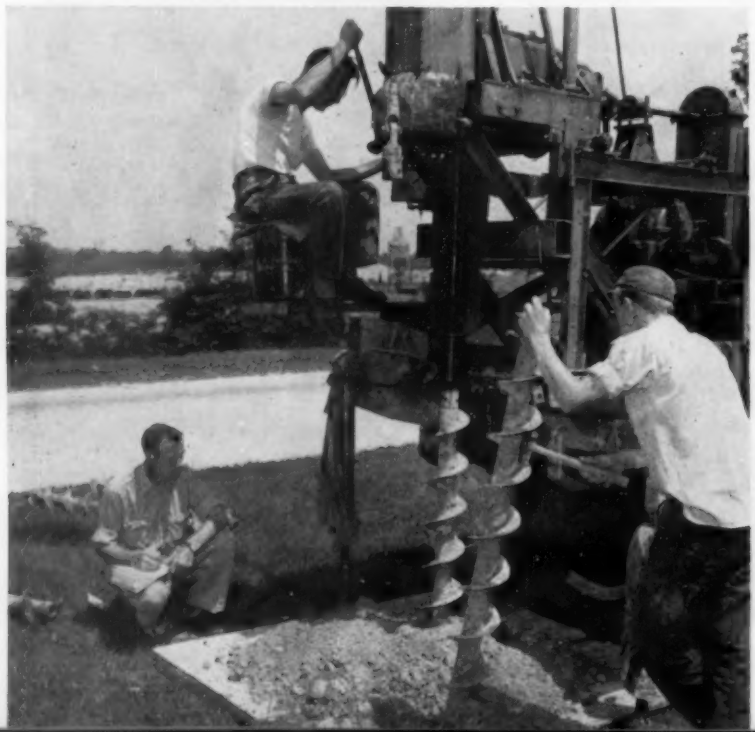
Priority A — If the completed report is required within two months; Priority B, within four months; Priority C, within six months.

Upon receipt of these plans, and study of the project, it is decided whether or not a CBR type of investigation is to be made, whether or not an electrical resistivity survey is indicated, and finally if the soil survey can best be made by the staff of the district materials engineer or by personnel from the Central Office Laboratory.



● Virginia department's electrical resistivity unit as normally set-up for use. This apparatus is similar to equipment used by the Bureau of Public Roads.

● Buda earth auger being used by Virginia soils crew along an existing highway to develop additional soil information.



Once the project investigation goes to the field, the actual soil survey is presently performed by means of equipment consisting of either a Buda earth auger having 8-in. diameter flights or with Jeep augers having 5-in. flights. The Buda equipment is capable of going to as much as 100 ft. into the earth, but this capacity is rarely required. The drill is mounted on an FWD truck (Model HA) of 17,000 G.V.W. There is a 5-ton front-end power winch installed as extra equipment which has proven to be extremely valuable when operating over rough terrain. The drill is a Buda Hurbon drill, Model HBL.

The Jeep augers are capable of drilling holes to approximately 30 ft. deep and are used to a great advantage where the going is not too difficult.

It is not feasible specifically to outline a definite sampling procedure for each project. However, an experienced soils engineer is on each survey and will plan making a boring every 200 ft. This rule is supplemented by a visual survey for changes in soil character and the interval may be more or less than the 200 ft. In addition, cuts are very closely observed with at least one sample taken for each type of soil in each cut. If changes in soil characteristics are noted within the cut area a sufficient number of borings is made to outline the extent of each type of soil.

Field observations are made as to the moisture conditions of the borings especially when saturated conditions are encountered. In this situation, definite recommendations for the provision of proper drainage is made. The occurrence of rock is also closely noted and if an electrical resistivity survey has not already been made it will be carried out before the soil report is made to the plans division.

The rock profile as determined by the resistivity unit is plotted on the preliminary plan roll and the data form a part of the regular soil survey. Where both types of surveys have been completed, a check is made on their correlation as well as with soil-rock conditions actually found on the project during construction. Our experience has been very good up to the present.

Although there has been a great deal of work done along these lines, we do not offer the information to our contractors on any basis other than as information for whatever use they care to make of it. Reports from those contractors have been very favorable.

There's a better way to keep your aggregate!

Stabilize your roads with MORTON SALT

There's no need to put up with costly aggregate loss — or bumpy, dust-ridden roads—when it's so economical and easy to stabilize them with Morton Salt.

Stabilizing gravel roads with salt:

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Morton Salt also does an outstanding job of stabilizing the base course of primary roads—helps prevent the 9 out of 10 road failures which result from faulty foundations.

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. . . for more details circle 213, page 16

HALF MILE... 8 HOURS

Roadway with 22 foot crown raised 3 feet with ULRICH-DOMOR Elevating Grader.

North Norfolk Municipality, McGregor, Manitoba, averaged 1/2 mile of completed road every 8 hours. The DOMOR is also used for ditching, road widening and material loading . . . adds versatility to the Caterpillar No. 12 Motor Grader.

Percy G. Alderson, Councillor, says, "We are more than satisfied with the DOMOR'S ability to build good, low-cost roads."

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DOMOR ELEVATING GRADER
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ULRICH
PRODUCTS CORPORATION
Roanoke, Illinois

. . . for more details circle 243, page 16

Industry Teamwork Was AED Keynote

Over 3,000 delegates attended record-breaking distributor convention, where machinery dealers and manufacturers considered mutual problems of serving the industry

DISTRIBUTORS gave their equipment manufacturer friends a place of new importance on the program, as they met in Chicago, February 24-27, for the Associated Equipment Distributors' annual convention. Manufacturer representatives participated in the daily general sessions, which included an "Industry Round Table," a "Sales Planning" panel, and a survey of "Distributor-Manufacturer Selling Policies and Practices."

The 3,000 delegates present represented 500 distributor organizations and over 300 manufacturer firms.

While much of the program was given to internal business problems — such as sales quotas, market analysis, factory contacts, what to pay tractor salesmen, etc. — at times the speakers came close to the problems of contractors and highway department equipment men. Some of the points in this direction:

- The Association by formal resolution threw its weight behind the President's highway program, endorsing it and assuring full industry cooperation.
- The whole problem of efficient selling and distribution as a joint effort by the manufacturer and distributor was reviewed during the week. This matter is considered vital to the progress of road building, as well as the welfare of contractors and other equipment owners, since intelligent selection of equipment for the job is involved.
- The growing stature of the AED as an industry spokesman was noted. Retiring president George W. Gagel, of Kansas City, Mo., in his address noted that the Association has been invited increasingly to participate in national affairs, in cooperation with such organizations as the Chamber of Commerce, Hoover Task Force Commission, Department of Defense.

● President-elect Ray J. Finn.

- The AED's joint effort with contractors has been intensified. The AED-AGC joint national committee which has functioned for several years has been augmented by formation of 25 local joint AED-AGC chapter committees. These local groups have worked to help solve mutual problems.

Retiring president Gagel also called for a re-appraisal of "such practices as excessive free service to equipment buyers, slipshod sales and managerial methods, total disregard of economic planning on trade-ins, and lack of sound thinking on financing long-term selling."

Contractor Speaks Out

- From the standpoint of the equipment man's contracting industry friends, the high point in the AED meeting was the blunt and forthright talk by John MacLeod, President of the Associated General Contractors of America and of Macco Corporation, highway-heavy contractor of Paramount, California. Excerpts from MacLeod's remarks are published on these pages.

The "forward look" of the week was furnished by President-elect Ray J. Finn, of Bode-Finn Company, Cincinnati. He reminded delegates of the original purposes of the Association, which are:

—To promote and maintain a cooperative spirit between legitimate distributors of construction equipment and their sources of supply.

—To disseminate information among members that will assist them to build their business on a broader scale.

—To exchange ideas of service for the benefit of users of construction equipment.

The following officers were install-

● 1955 AED Executive Committee. (Standing): F. J. Fitzpatrick, Parker-Danner Co., Hyde Park, Mass., Treasurer; H. D. Anderson, Rish Equipment Co., Bluefield, W. Va., Vice-President; M. F. MacDonald, F. H. Hopkins Co., Ltd., Montreal, Quebec, Canada, Vice-President; P. D. Hermann, Associated Equipment Distributors, Executive Secretary. (Seated): L. Miner Doolen, Telford Equipment Co., Lansing, Mich., Vice-President; Ray J. Finn, Bode-Finn Co., Cincinnati, Ohio, President; and S. F. Laskey, Northwestern Equipment, Inc., Fargo, N.D., Executive Vice-President.

A Contractor Speaks Bluntly to Distributors

Equipment distributor and manufacturer representatives at the Associated Equipment Distributor meeting in Chicago were addressed, among other speakers, by John MacLeod, President of the Associated General Contractors of America, Inc.

Mr. MacLeod, who is head of Macco Corporation, large highway-heavy firm on the West Coast, first laid the groundwork for his criticism of some distributors, by discussing the team aspects of the distributor-manufacturer-contract relationship, as being vital to efficient construction operations.

"We have the common objective," said MacLeod, "of the construction of better projects more rapidly and more efficiently. The development of new and better machinery during the past 20 or 30 years has made possible our modern and efficient construction methods. But I believe we can do even better, so that the public will continue to receive greater value for its investment in construction."

New Industry Responsibility

MacLeod stressed the new responsibility the industry has by virtue of the great volume of construction, which has set records for ten consecutive years, and is headed for an all-time-high of $40 billion for new construction and $16 billion for plant maintenance in 1955.

"How does a contractor look at the distributor and the manufacturer?" asked MacLeod.

"First, as to manufacturers," he said, "I am sure most realize that if they are to stay in business, they must continue to develop even better and more efficient machinery."

John MacLeod, President of the Associated General Contractors.

"As to distributors," he continued, "I know that conditions have changed, and that it is now a buyers' market. You may feel that it is harder to sell now than it was before. But I believe that you will be able to sell as you make yourself helpful to the contractor.

"First let me point out that the competition between general contractors for the new work coming on the market is terrific. That means that in order to get the job we are having to bid very carefully. And to keep from losing money, we are having to explore every possibility for more efficiency and economy.

"When we get a job, it will be very important to us as contractors that we know what pieces of equipment will do each part of the job most economically. Hence the distributor can perform a great service to the contractor in knowing the capacity and limitations of the equipment he handles, and in giving the contractor reliable information on the best equipment he needs for the job.

"You will make friends," MacLeod went on, "and you will build good will if you give the contractor the information he needs, and not just try to sell him to make a sale. Certainly a knowledge of construction methods will help the dealer make the correct recommendation to the contractor.

Dealer's Responsibility Continues

"After the dealer has sold the contractor a new and improved piece of equipment, I think it is logical to expect that the dealer should be able to properly instruct the contractor's operators in the proper and safe handling of the equipment, and how to maintain it. And I want to repeat, instruct operators in how to operate it safely."

MacLeod concluded this part of his talk by urging, "I don't know how I can emphasize too strongly, particularly in these days of such keen competition, that the contractor needs repair parts for equipment promptly. A contractor cannot afford to have equipment idle very long while repairs are made. It is particularly expensive on highly mechanized jobs where one piece of equipment may be in a key spot where its failure will tie up a whole production line.

"Both the distributor and the contractor are better off when there prevails between them what we might just call good business relationships."

ed to head AED for 1955:

President: Ray J. Finn, Bode-Finn Co., Cincinnati.

Executive Vice-President: S. F. Laskey, Northwestern Equipment, Inc., Fargo, N. D.

Vice-Presidents: L. Miner Doolen, Telford Equipment Co., Lansing, Mich. (Second term); H. D. Anderson, Rish Equipment Co., Bluefield, W. Va.

Vice-President and Director (Canada): M. F. Macdonald, F. H. Hopkins & Co., Ltd., Montreal, Quebec.

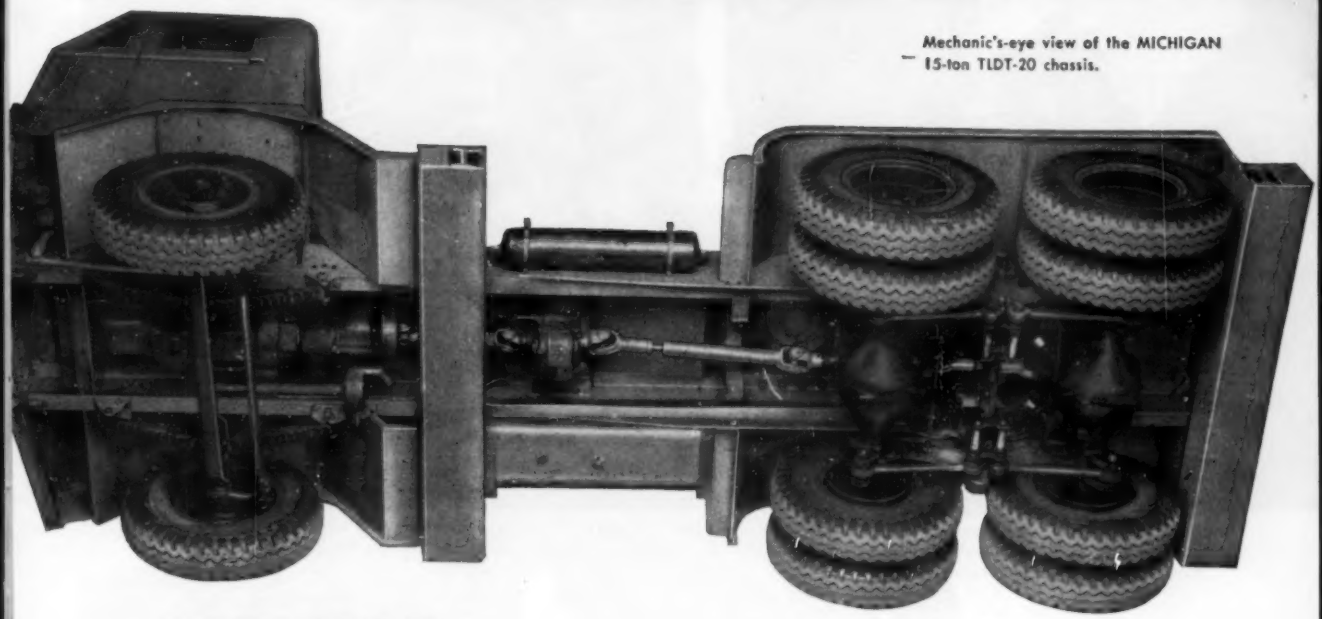
Treasurer: F. J. Fitzpatrick, Parker-Danner Co., Hyde Park, Mass.

Directors: Charles C. Wing, R. B. Wing & Son Corp., Albany, N.Y.; George E. Furnival, Furnival Machinery Co., Philadelphia, Pa.; William C. Coleman, Bemiss Equipment Corp., Richmond, Va.; Earl J. Blanchard, Blanchard Machinery, Inc., Miami, Fla.; Frank J. Lorenz, The Lorenz Equipment Co., Columbus, Ohio; John R. Borchert, Borchert-Ingersoll, Inc., St. Paul, Minn.; Jewell A. Benson, Benson Tractor Co., Houston, Texas; Philip A. Dufford, Intermountain Equipment Co., Boise, Idaho; Water W. Kershaw, Wheeler-Kershaw Co., Salt Lake City, Utah.

Agricultural limestone for ice control at airport

The use of limestone dust for combating icy conditions on airport runways is reported by Frank Hidinger, airport manager, Cedar Rapids, Iowa.

As related in a brief news item in the DES MOINES REGISTER, the use of the limestone has failed in its purpose only when there were high winds and sub-zero temperatures at the same time. The limestone reportedly "seats" in the ice if it can be made to remain there for two or three minutes, because of a heating action in contact with the ice which then refreezes.

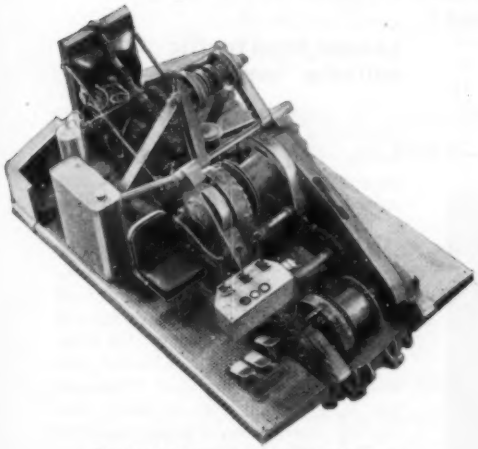


Mechanic's-eye view of the MICHIGAN 15-ton TLDT-20 chassis.

NEWS!...More Quality Features

are Standard Equipment on MICHIGAN

½ yard models than on any comparable machine



The basic ½-yard turntable mechanism —maximum service accessibility.

Front-view of four of the MICHIGAN's six adjustable hook rollers.

In your point-for-point comparison (a smart buying tactic!) take special note of these great value features—"extras" on many other makes, standard on MICHIGAN ½ yard Truck Excavator-Cranes.

16-Ton Axles — tremendous strength! No wonder your MICHIGAN stands years of punishment.

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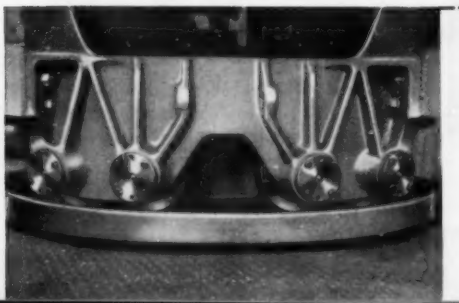

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● (Left): Ottawa Hydra-Hammer at work removing old curb and gutter. (Right): Gradall is loading the Ford trucks at street-side location where curb and gutter did not previously exist, leaving neatly formed trench for widening strip.

Arterial Widening Through Small Town

THE accompanying pictures illustrate methods used by Clark Construction Company of Grand Ledge, Michigan, in handling a street widening job through White Pigeon, Michigan.

Completed during the 1953 season, this project consisted of widening a 24-ft. pavement on U. S. Route 112 by the addition of 9-ft. strips on each side. The improvement extended about one-half mile through the town.

The old curb and gutter were broken up for removal with an Ottawa Hydra-Hammer. A Gradall machine picked up the broken material and loaded it into trucks, progressing along the curb at the rate of about 600 to 700 ft. in a 12 or 13 hour day. The loader's production was held back somewhat by lack of sufficient trucks to keep it constantly at work.

In addition to the above units, the contractor employed one Lorain TL 25 crane, two Reo 5-yd. dump trucks, one Ford 5-yd. dump truck, one Oliver tractor with angle dozer, one portable concrete mixer, and Blaw-Knox batching bins for use in mixing concrete for the widening.

Project was supervised by the Michigan state highway department, Earl Sanford, inspector.

● Concrete widening strip in place. Provision is made for ultimate bituminous resurface.

Longer haul traffic called a "myth"

The argument that toll highways generate a large volume of long haul traffic "is a myth," said Samuel P. Brown, partner in the New York consulting engineering firm of Coverdale & Colpitts, in Milwaukee recently. Speaking with insurance officials over the outlook for a toll road across Wisconsin, Brown did not feel a toll road would create a new traffic pattern of cross country movement in this area.

Coverdale & Colpitts, who last year made a survey for the Wisconsin Turnpike Commission on traffic and earning possibilities of a proposed toll road in Wisconsin, gave an adverse report on this project. In attacking the long haul myth, he pointed to the fact that on the New Jersey turnpike only 6% of the travel is for the full distance of 118 miles between New York and Wilmington, Del.

Another "myth" spelled out by Brown is the belief that most road users desire to bypass large cities. Surveys in New Jersey, Indiana and Michigan have shown that the vast majority of vehicles approaching New York city, Chicago and Detroit had their destination there.

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. . . for more details circle 259, page 16

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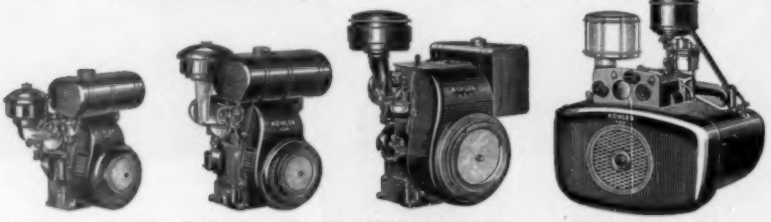

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Beefs Between County Men and Contractors

—and Suggestions for a More Productive Engineer-Contractor Relationship

A high point in the three-day program of the American Road Builders Association's Second Annual County Conference (Columbus, Ohio, Sept. 13-15, 1954) was the blunt, forthright summary by E. N. Rodgers. Herewith reviewed by a ROADS AND STREETS *staff representative.*

AN APPEAL for a harmonious and productive relationship between county engineers and contractors was made at the Columbus meeting by E. N. Rodgers, engineer-manager of the Alabama Road Builders Association.

The contractors' representative emphasized that conflict is costly:

"Personalities in the contracting industry play a large part in the writing of specifications, while I tell you here, as a contractor's agent, that the personality of the engineer on a project enters into the cost figures of the contractor just as much as labor, material, or equipment rentals.

The Engineer's Complaints

"A few sources of special irritation to the engineer are — inexperienced and discourteous supervisory contractor's personnel, with no "know-how" or diplomacy — a sloppy and undermanned organization — inadequate equipment to do the job because of small capacity, age or improper maintenance — continual destruction of construction stakes — failure to maintain an orderly construction schedule — a tendency to rough-out work throughout the length of the project for estimate purposes with no inclination to return to finishing operations on schedule — lack of timely advice as to plans for prosecution of work as affecting layout — lack of desire on the part of the contractor to properly complete finishing items in a workmanlike manner because of small or no pay left for his estimate — an inclination by the contractor to belittle the engineer's judgment or instructions, with a tendency to go higher up for relief from his persecution, as he calls it — lack of visits and attention to the construction project by executives of the contracting firm accompanied by improper delegation of final authority while they are away. The contracting industry can and should remedy the majority of these in order to prosper."

Contractor's Wailing List

On the other hand, continued Rodgers, one of the most controversial issues of construction, and the most irritating to the contracting industry, is the insistence on the part of the engineering profession to specify both methods and results, without bearing any responsibility if the demanded method doesn't produce the expected result. A contractor is told how, when and where to proceed with an item of work. His procedure is watched carefully, corrected if he strays from the outlined method, and when the result is a disappointment he is told to tear it down and replace it at his own expense. This detailed outline of procedure invades the contractor's prerogative, destroys his initiative and discounts his know-how from past experience, often times with disastrous results to his fair profit on the job.

"In Alabama," said Rodgers, "the state highway department will not let a bridge contractor proceed until the bridge department approves a sketch of his proposed falsework, forms and cofferdams layout. During construction, if a span sags or a girder twists out of line, he is made to replace it at his own expense. In the case of a cofferdam, if it floods or goes out using their plan, the contractor solely is the loser.

"In fairness to the specification writers, I will say that I believe the industry has contributed indirectly to the engineer's insistence on methods as well as results; for example, by using influence with higher up (either elected or appointed) non-engineering officials to "leave-in" poor completed work which does not meet the required result.

What Contractor Should Do

To remedy these and other misunderstandings, Mr. Rodgers said, the contractor should:

- Inspect the project carefully before bidding in order accurately to foresee the physical difficulties which may be encountered.
- Submit an intelligent contract price based on accurate cost analysis, plus ample provision for unforeseen contingencies and a fair overhead and profit.
- Maintain experienced, capable, courteous supervisory personnel, supported by a well ordered and manned organization equipped with adequate, modern, high capacity and well-maintained equipment.
- Take genuine pride in doing good work with or without inspection.
- Carry sufficient working capital to maintain an orderly balanced work schedule.
- Have an earnest desire to cooperate with workable tolerance of human failures and faults.

What County Engineers Should Do

- Draw accurate plans and specifications, with no notes which might have a double meaning.
- Write specifications which require results only with methods and construction details left to contractor.
- Be sure of accurate and prompt construction staking, be willing to bear responsibility for errors.
- Employ trained inspectors and engineers who are capable of interpreting the plans and specifications from a practical standpoint, who are sufficiently experienced to recognize standard construction procedures and who have authority to act. "Most specifications state a competent superintendent as his agent on the work, with full authority to execute orders of the engineer. As part of the contract why shouldn't the awarding authority be compelled to maintain a project engineer of like capacity?"
- Make quick and fair decisions regarding both minor and major items of the contract with prompt engineering assistance and cooperation.
- Compensate fairly for all work even though it lies outside the terms of the contract or specifications, at a price acceptable to both parties, before work is done.
- Maintain firm but practical inspection and control.
- Pay both monthly and final estimates promptly, with all differences of quantities full and fairly arbitrated where they are questioned by either party.
- Make prompt final inspection and acceptance without the disheartening task of doing the finishing more than once.

Another main source of chronic irritation to the contracting industry, named by the speaker, is the failure of the engineer to share responsibility for errors in construction staking and other misjudgements. "I recently witnessed," said Rodgers, "a case of the construction of a bridge pier, built to the engineer's stakes only to be two inches out of line on completion, with the contractor being ordered to remove it and replace at his own expense.

"Frankly, as an engineer, I cannot reconcile this as ethical for the profession. If the engineering profession is not willing to assume any responsibility in this matter, the answer is to include the construction staking as a responsibility of the contractor, allowing him to hire and fire his own force and including their cost in his bid price.

"A contractor, to successfully compete, must be equipped with high-priced, large volume modern machinery, operated at full capacity. If the engineering personnel on the job is not geared likewise, the contractor consequently suffers by slow-ups, shut-downs, etc., resulting in much unhappiness on his part and bickering with the engineer. Quick and fair decisions by the engineer on both minor and major items of the contract are of inestimable value since time is of the essence to him. I can tell you without fear of contradiction, that a contractor had rather have a prompt decision, even if it's a No, rather than a delayed Yes, if it will avoid costly delays and confusion.

"There is sometimes a tendency on the part of the engineer to be skimpy or unfair in compensation for work, the need for which may arise during construction, but which actually lies outside of the terms of the contract.

"As an example of this, I am reminded of an incident on an Alabama construction project. The contractor had a price for Class A culvert concrete, for headwall concrete, and as the project was along an existing road a price for culvert extension concrete, each higher than the other. A new culvert was built, finished and left.

"Later, either because of an error or a raise in grade, this new culvert had to be extended. When the estimate came in the contractor was paid at the lowest price for Class A culvert and told by the engineer that it was not culvert extension concrete because he had built the short culvert himself.

"Suppose this contractor had built the old culvert years before — would this reasoning apply? After some negotiation the engineer was overruled by higher authority and the contractor paid at the correct price. The criterion in this decision was purely dollars and cents for the awarding authority without thought of equity or injustice to the contractor."

AGC-APWA construction forms announced

The American Public Works Association and The Associated General Contractors of America have published a complete set of uniform construction forms, intended for use on municipal engineering construction projects.

The forms were developed by experienced municipal administrators and contractors in this public works field whose combined efforts have produced a practical working set of documents. They have been officially approved by both associations. Entitled "Uniform Public Works Engineering Construction Forms," the document includes (1) Invitation for Bids, (2) Instructions to Bidders, (3) Bidder's Proposal, (4) Contract or Agreement, and (5) General Conditions of Contract.

The language and arrangement of the forms were designed to provide an easily understood document, avoiding highly technical and legal terminology. The documents may be used as printed, or adapted for particular conditions.

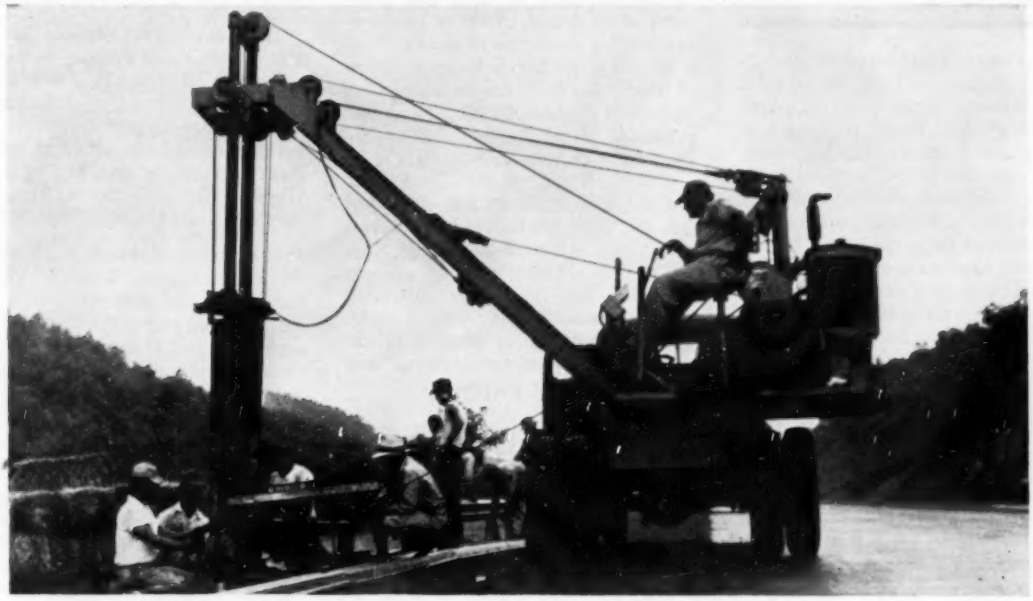
Publication of the forms marks completion of the most important task undertaken by the Joint Cooperative Committee of the two associations since established in October, 1952.

Members of the committee representing APWA are George Thompson, city engineer, Detroit, co-chairman; Warren A. Coolidge, director of public works, Nashville; John Flockhart, chief engineer, department of public works, Newark; Roy Mcease, city engineer, Salt Lake City; Lyall Pardee, deputy engineer, department of public works, Los Angeles; J. G. Rollins, director of public works, Dallas; Milton Rosen, former commissioner of finance, St. Paul; and D. F. Herrick, executive director of APWA, Chicago, co-secretary.

Members of the committee representing AGC are C. Russell Ralph, Kaw Paving Co., Topeka; Albert D. Blakeslee, C. W. Blakeslee & Son, New Haven; Henry Boh, Boh Bros. Construction Co., New Orleans; V. B. Higgins, V. B. Higgins Co., Greenboro, N. C.; F. S. Oldt, F. S. Oldt Co., Dallas; H. P. Phelps, St. Paul Dredging Co., St. Paul; J. A. Thompson, J. A. Thompson & Son, Inglewood, Calif.; and James M. Sprouse, AGC national staff, Washington, co-secretary.

Copies are available from Associated General Contractors, 1227 Munsey Building, Washington 4, D. C. Prices are 25c each, $2.75 for 12, and $20 for 100. The document is designated APWA Standard Form A and AGC Standard Form 10.

LITTLE GIANT POST DRIVER



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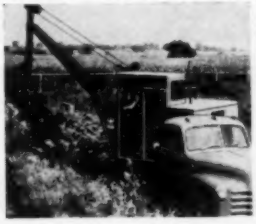

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New Publications

"MATERIALS OF CONSTRUCTION," by M. O. Withey and G. W. Washa; John Wiley & Sons, 440 4th Ave., New York 16, N.Y. 887 pages; $9.00.

This new book supplies the essential information on the sources, manufacture, and fabrication of the principal materials. With the use of carefully selected data, the authors cover the more important mechanical and physical properties, and the influences of various factors upon these properties. Reflecting the latest methods and statistical data, the volume includes material on new testing machines and strain-measuring devices, and a section on non-destructive testing. The chapters on timber cover chemical seasoning, wood products, and timber connectors. In the full coverage accorded the subject of concrete, "Materials of Construction" deals with new types of cement, modern testing methods, and the influence of alkalies on durability, as well as up-to-date details on mix design methods, and checking the properties of fresh and hardened concrete.

The book also surveys the current knowledge on wrought iron, alloy steels, non-ferrous metals, fatigue of materials, effect of mechanical work on the properties of steel, heat treatment of steel, and effects of temperature on the properties of metals.

Professor Withey is Emeritus Dean of the College of Engineering, University of Wisconsin. Dr. Washa is professor of mechanics, also at the University of Wisconsin.

ENGINEERING RESEARCH BULLETIN No. 28, College of Engineering, Rutgers University, New Brunswick, New Jersey. Price $1.50. 14th of a series of 22 reports. This one deals with Salem County, New Jersey, only. Valuable reference as example of soil survey and report for highway and other engineering purposes.

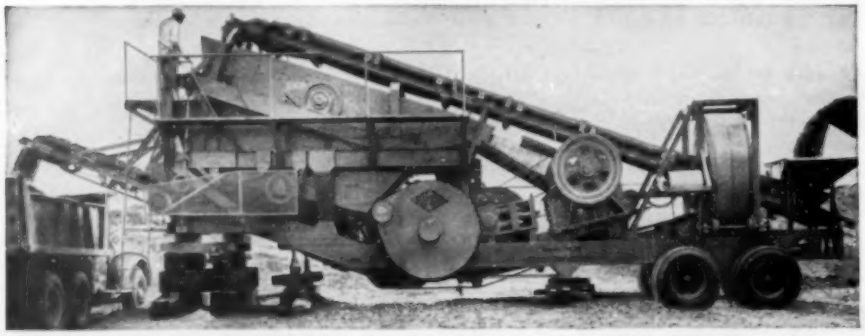
PROCEEDNGS OF ANNUAL MEETING EDUCATIONAL DIVISION ARBA. A panel discussion on graduate work in highway engineering led by L. J. Ritter. Available at price of 75¢ remitted to the American Road Builders Association, World Center Bldg., Washington 6, D. C. Half price to ARBA members.

LATEST DEVELOPMENTS IN AIR ENTRAINED CONCRETE. Practices, experiences and tests with air-entraining agents and office and field data. Report No. 4537-E. Price $14.50. J. J. Berliner & Staff, 684 Broadway, New York 12, N.Y.

HIGHWAY ACCIDENTS AND RELATED FACTORS contains five papers presented at the Highway Research Board's 33rd annual meeting on accident studies, engineering and psychological factors, and the effect of enforcement on vehicle speeds. Price 75¢. Highway Research Board, 2101 Constitution Ave., Washington, D.C.

CHEMISTRY OF PORTLAND CEMENT. By R. M. Bogue; Reinhold Publishing Corp., 430 Park Ave., New York 22, N.Y. 793 pages. Price $16.50. Second edition of this widely read basic reference reflects recent developments in portland cement chemistry and technology. Written especially for chemists and technologists engaged in cement formulation or manufacture.

RELATIONSHIP BETWEEN GOOD TRAFFIC LAWS AND SAFE MOTORING. A report by the Indiana Legislative Study Commission on Traffic Safety. Recommended reading for all highway and municipal officials and state legislative committeemen. Copies available from the Commission at 102 North Senate Ave., Indianapolis 4, Ind.



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. . . for more details circle 264, page 16

RECORD LOADING PRODUCTION WITH ATHEY FORCE-FEED LOADERS

Clock the loading rate of an Athey 7-11 Force-Feed Loader, companion tool of the Caterpillar Motor Grader. The 7-11 picks up and loads *10* cubic yards each and every minute in loose materials and *20* cubic yards a minute in snow . . . and this production is as steady as your watch. The 7-11 is ruggedly constructed, enabling it to ignore the shocks and abuses that put most loaders on the scrap pile. The exclusive features of the 7-11 Force-Feed Loader put it in a loading production class all its own.

You can have assured high production on your loading operations with the Athey 7-11 Force-Feed Loader . . . and your Athey-Caterpillar Dealer can show you how and why. Ask him or write for information.

The Athey 7-11 Force-Feed Loader can turn out record loading production, in most material, when loading from windrow or from stockpile . . . and it teams with the Athey PB3 Portable Breaker to reclaim worn blacktop, gravel or oiled surfacing with savings of 60% to 75%. Ask your Athey-Caterpillar Dealer for facts on the Athey Method.

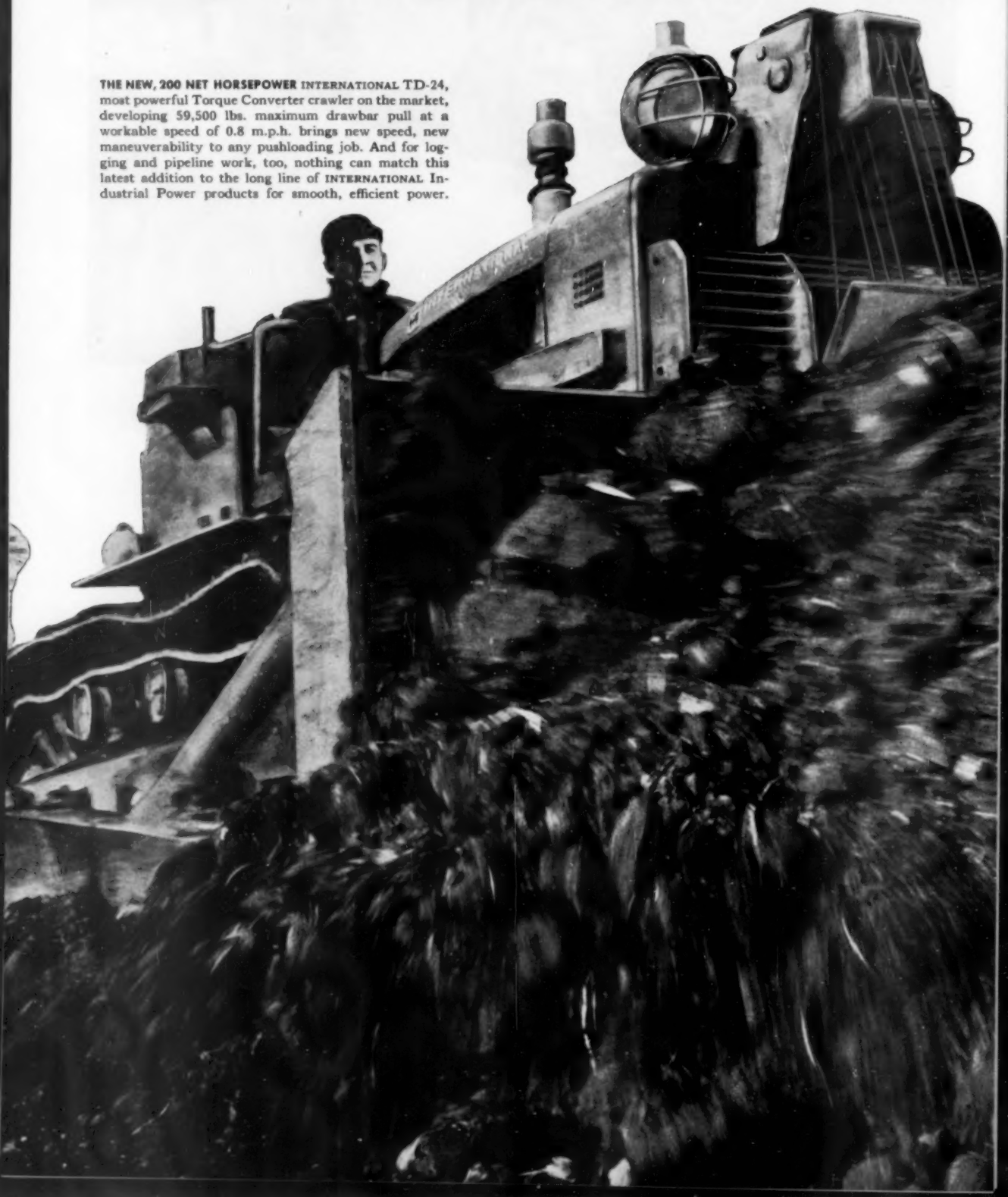
ATHEY PRODUCTS CORPORATION
5631 West 65th Street
Chicago 38, Illinois

Athey high-production LOADERS

. . . for more details circle 164, page 16

PRESENTING THE NEW International

THE NEW, 200 NET HORSEPOWER INTERNATIONAL TD-24, most powerful Torque Converter crawler on the market, developing 59,500 lbs. maximum drawbar pull at a workable speed of 0.8 m.p.h. brings new speed, new maneuverability to any pushloading job. And for logging and pipeline work, too, nothing can match this latest addition to the long line of INTERNATIONAL Industrial Power products for smooth, efficient power.



TD 24 Torque Converter

Greater power—200 net engine h.p.; greater pull—59,500 lb. maximum drawbar pull at 0.8 m.p.h.; matchless maneuverability—finger-tip steering with famous Planet Power Drive in combination with four forward and four reverse speeds; all the features that mean greater operator ease, greater operational economy on your biggest jobs

For the largest earthmoving projects . . . for laying big pipe faster and surer . . . for attaining new highs in logging production . . . this is it.

The new INTERNATIONAL 200 horsepower TD-24 Torque Converter crawler tractor.

Features that put the new Torque Converter TD-24 in the No. 1 spot include:

- World's most productive torque converter system—multiplies torque up to five times.
- 200 net engine horsepower converted into 59,500 lb. maximum drawbar pull at 0.8 miles per hour.
- Finger-tip hydraulic control with INTERNATIONAL'S famous Planet Power Steering in combination with four forward and four reverse speeds to 6.9 miles per hour for matchless maneuverability, unequalled profit-making performance.
- Instantaneous high-low range shift with all transmission shifting being done with *just one gear shift lever.*
- INTERNATIONAL'S exclusive "Decelerator" feature gives the operator complete control of the crawler's engine speed at all times. In pushloading, this enables him to match the speed of the pusher to that of the scraper and make smooth contact without jarring pushed equipment or its operator. It takes the shock loads out of shifting . . . gives a smoother performing machine on the pipelines and pulling belt loaders, as well as on 'dozing jobs.

All attachments to the standard INTERNATIONAL TD-24 are interchangeable with the Torque Converter model, including push-plates, bulldozers, *Bullgraders* and sidebooms.

For the smoothest package of power you ever saw in action, contact your INTERNATIONAL Industrial Power Distributor today. Ask for a demonstration of the INTERNATIONAL TD-24 Torque Converter . . . the most efficient torque converter crawler for any big job.

INTERNATIONAL HARVESTER COMPANY,
CHICAGO 1, ILLINOIS

INTERNATIONAL HARVESTER

INTERNATIONAL®
INDUSTRIAL POWER

MAKES EVERY LOAD A PAYLOAD

PUSHLOADING is faster, easier with an INTERNATIONAL TD-24 Torque Converter. When the new crawler is paired with INTERNATIONAL high-speed earthmovers, contractors have a combination that can't be touched for long-haul performance. You get the heavy push you want at the speed you need for steady contact without gear shifting. This great power plus control means far greater safety, far less wear and tear on men and equipment.

DOWFLAKE SAVES UP TO $300 PER MILE ON GRAVEL ROAD MAINTENANCE COSTS

Actual experiences show that DOWFLAKE treatment reduces gravel loss 80% and grading costs 85%

That's right! You can actually save up to $300 per mile per year by treating your gravel roads with Dowflake® (Dow calcium chloride 77-80%). By stabilizing roads with Dowflake, gravel loss can be cut 80% and grading costs can be reduced 85%. These figures have been proved by experience under actual conditions on typical roads.

The annual surface loss on untreated gravel roads ranges from one half an inch for local roads to three quarters of an inch for primary roads. On Dowflake treated roads, the saving of 80% means a saving of almost five eighths of an inch or over 160 cubic yards of gravel per mile.

The 85% saving on grading costs on Dowflake-treated roads is important from the standpoint of available manpower and equipment . . . both can be used more economically, which means dollars saved.

In your locality you may realize even greater economies with Dowflake, for the amount of road travel and costs of material and labor vary. In addition to road stabilization, Dowflake is being used on gravel roads throughout the country to keep down dust and to decrease the damage of spring breakups by reducing the effect of frost.

Ask about Peladow®, Dow's new high-test, pellet-form calcium chloride (94-97%) also engineered for highway use. In addition to 100 lb. bags, Peladow can be shipped bulk in closed hopper cars.

Contact Dow now and get the complete story on how Dowflake and Peladow can make *better—more economical—and safer roads.* THE DOW CHEMICAL COMPANY, Midland, Michigan.

you can depend on DOW CHEMICALS

DOW

. . . for more details circle 183, page 16

Gauging device for concrete curing time

The materials laboratory staff of the Kansas highway department has developed a method for determining the allowable time between the finishing of concrete pavement and the moment of applying the curing cover.

This relatively simple appartus consists of a pan of water connected with a burette which is read every hour. A curve has been plotted which shows the rate of evaporation and the allowable time before concrete would be weakened by quick loss of water by evaporation. Twelve of these gauges have been built and have been used on 1954 paving work.

The following comment on the device was received from R. L. Peyton, engineer of research, Kansas Highway Commission:

"This device was developed as a result of an opinion in this state that more attention should be given to the effect of weather conditions on concrete pavements during the construction season, with respect to time of applying curing cover. The device is a modification of one used by the Minnesota state highway department, which supplied us with the original information on it and the calibration curves that go with it.

"Essentially it measures the rate of evaporation of water relative to the weather conditions at any given hour. The rate of evaporation is then related to the time available between placing concrete and applying of curing medium, by means of a calibrated curve also obtained from the Minnesota department. So far, our efforts have been directed toward checking the curve in an attempt to determine its suitability under Kansas conditions and with Kansas materials. Two curves are used which show either the time that may be allowed between concrete and covering it, and the allowable time between the end of finishing operations and the time of covering. The instrument built in Kansas differs slightly from the one used in Minnesota. Ours is somewhat simpler and less expensive to build and we think it is easier to clean and maintain.

"These instruments have been placed on all major pavement projects this year, and data are being accumulated for study at the end of the season. Preliminary studies indicate that some revisions of the Minnesota curves will be necessary to properly control this factor in Kansas under local weather conditions."

Ted Roberts of the Kansas highway department staff is shown working on the gauge.

● New gauge developed in Kansas for timing the moment of applying curing cover to concrete — shown in connection with a paving project on U. S. 40 near Junction City.

AGC Elects New Officers

George C. Koss, president of the Koss Construction Co. of Des Moines, one of the nation's largest concrete paving contractors, is the 1955 president of the Associated General Contractors of America. He succeeds John MacLeod, president of Macco Corp., of Paramount, Calif. Frank J. Rooney, president of Frank J. Rooney, Inc., of Miami, Florida, is vice president.

In announcing the new officers installed at the AGC annual convention in New Orleans March 14-17, managing director H. E. Foreman also reported the election of 23 new AGC directors for three-year terms. Representing various of the 12 districts which take in AGC's 6500 member firms, these directors are as follows, by states:

Alabama — Jno. R. Lathram, Sullivan, Long & Hagerty, Bessemer (Highway)

Arizona — Edward O. Earl, San Xavier Rock and Sand Co., Tucson (H)

California — Charles L. Harney, Chas. L. Harney, Inc., San Francisco (Heavy and RR)

Colorado — C. L. Hubner, C. L. Hubner Co., Denver (H)

Connecticut — A. J. M. Giardini, The Associated Construction Co., Hartford (Building)

Idaho — W. C. Foss, J. A. Terteling & Sons, Boise (Heavy and RR)

Illinois — Percy F. Louiselle, Triangle Construction Co., Kankakee (H)

A. L. Jackson, A. L. Jackson Co., Chicago (Building)

Iowa — Ray Van Buskirk, Ira Van Buskirk & Sons, Hawarden (H)

Michigan — C. L. Davis, Miller-Davis Co., Kalamazoo (B); William J. Storen, Jr., W. J. Storen Co., Detroit (Heavy and RR)

New York — R. P. Bayard, Johnson, Drake & Piper, Inc., New York (H)

Ohio — Fred I. Rowe, W. L. Johnson Construction Co. & Associates, Columbus (Heavy and RR); A. J. Baltes, A. J. Baltes, Inc., Norwalk (H)

Oklahoma — W. D. Amis, Amis Construction Co., Oklahoma City (H)

Pennsylvania — M. C. Harrison, Harrison Construction Co., Pittsburgh (H)

South Carolina — W. E. Tulluck, Wannamaker & Wells, Orangeburg (H)

Irwin Kahn, M. B. Kahn Construction Co., Columbia (B)

Tennessee — J. Gilbert Stein, Stein Construction Co., Chattanooga (Heavy and RR)

Texas — Fred Fisher, Fisher Construction Co., Houston (Building)

F. S. Oldt, F. S. Oldt Co., Dallas (Heavy and RR)

Utah — J. P. Gibbons, Gibbons & Reed Co., Salt Lake (Heavy and RR)

Virginia — W. Curtis English, English Construction Co., Altavista (B)

Michigan concrete yardage

Concrete paving awards in Michigan during 1954 totaled 5,891,000 sq. yd., equivalent to 456 miles of 22-ft. two-lane road, according to figures from the local office of the Portland Cement Association. This new post-war record paving volume included square yardage equal to 120 miles on trunk lines and 335 miles of local streets and alleys.

Reconditioning Tractor Parts

By D. R. Lammers
Service Manager
Caterpillar Tractor Co.

D. R. Lammers

NOW that new parts are readily available, machine owners should carefully consider the value of reworking worn parts. Many ingenious methods of rehabilitating worn tractor parts have been practiced in recent years. Some of these salvage methods proved to be practical and economical, while others were expensive but necessary to keep badly needed machines in operation.

Many reconditioning practices are so practical and have been universally used so long that we forgot to classify them as such. Among these are regrinding crankshafts, turning track pins and bushings, and reboring and sleeving bearing bores in transmission cases and final drive covers.

Etching and raising the ridge in worn cylinder liners, using wide top compression rings on worn pistons, and installing valve seat inserts in cylinder heads are common salvage practices on engine parts. The practices of hard-facing cutting edges and bucket teeth, straightening sheet metal guards and hoods, and building up with electric weld worn spots on heavy fabricated steel parts, will remain popular because of their economical value.

● Other practices have become common due to parts shortages in the past and will continue to be popular because they have proved to be practical. Included in this group are the building up of track grousers, track rollers, idlers and sprockets, and regrinding track roller shafts using undersize bushings.

Welding new rims on sprockets, building up the outside of worn steering clutch drum or using extra-thick brake linings, and installing clutch drive rings in flywheels have also become widely accepted. The simple taper pin method is common for the repair of cracked cylinder heads.

Track links have been built up with electric welding rod which has been entirely successful but the economy of this operation is questionable. The advisability of repairing track links by this method can best be determined by local experience.

Obviously, if a part can be reconditioned for much less than the cost of a new part and if the reconditioned part functions properly with a new life expectancy approaching that of a new part, the owner will prefer to have the part reconditioned. Many times, however, it will prove to be better to purchase new parts.

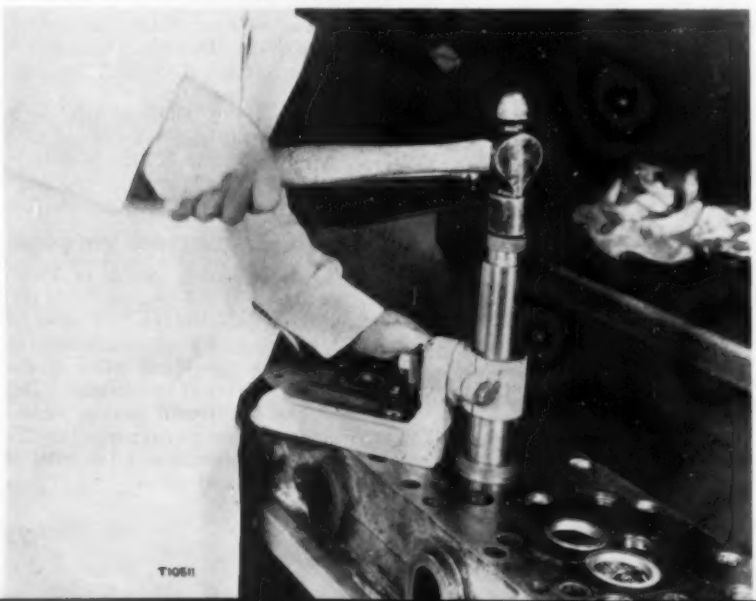
● Some reconditioning procedures are practiced which are believed to be definitely not advisable. Foremost among these is the repairing of fuel injection pumps. This frequently results in inaccurate fuel injection timing because of variations in dimensions of fuel pump bodies. Repairmen invariably neglect to compensate for these variations. The discrepancies in timing usually are not great enough to cause noticeable malfunction of the engine but could easily nullify the saving by increasing the fuel consumption or rate of depreciation of other engine parts.

An owner will spend less for fuel injection pumps by buying new pumps only when the old pumps are worn enough to cause hard starting or a noticeable lack of power.

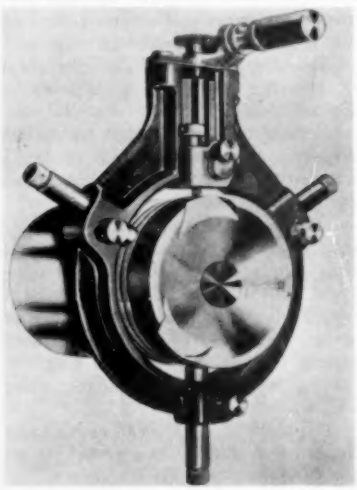
Regrinding crankshafts to intermediate undersizes is another example of false economy in reconditioning parts. It is recommended to use the shaft until it is worn enough that it should be reground to the standard undersize. Regrinding long before the crankshaft reaches this point is unnecessary and a waste of money. It also requires additional labor in the special fitting of bearings.

In summary, the practice of sound, economical parts reconditioning results in better and lower cost service for machine owners.

● Installing valve seat inserts in cylinder head.



● Regrooving top piston ring.



Boost your payloads and your profits
. . . with GALION Duo-scopic hoists

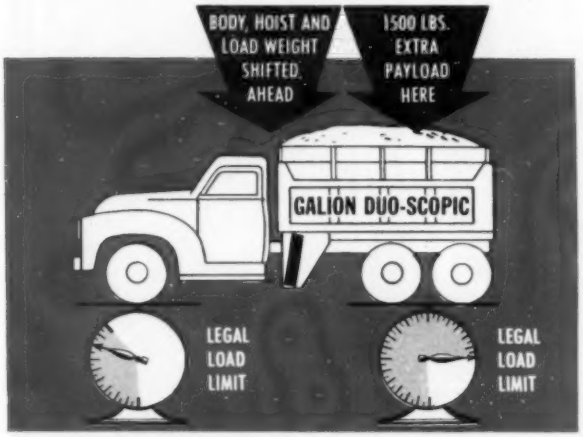
Carry up to 1,500 bonus pounds every trip

Here's how you can carry bigger loads

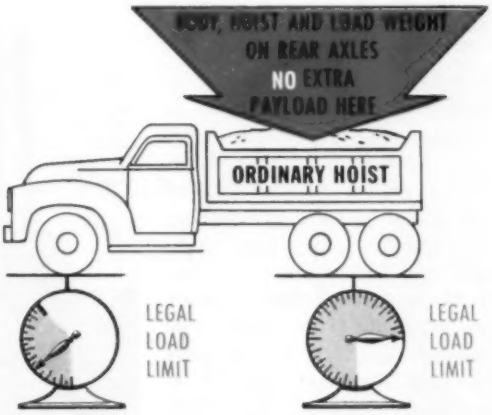
Duo-scopics are engineered to eliminate unnecessary waste weight and to move a greater portion of hoist, body and load weight forward off the truck's rear axles. This improved load distribution makes full use of the increased capacity of your modern truck's front axle.

What's more, the weight-saving construction of Galion's matching heavy duty contractor's dump bodies further reduces waste weight.

Because of Galion's combined weight reduction and relocation, you can add extra profit-making payload to your truck's rear axles *without exceeding legal weight limits!*


BODY, HOIST AND LOAD WEIGHT SHIFTED AHEAD
1500 LBS. EXTRA PAYLOAD HERE
GALION DUO-SCOPIC
LEGAL LOAD LIMIT
LEGAL LOAD LIMIT

Redistributed weight adds payload capacity to truck equipped with Galion Duo-scopic hoist! Truck's gross weight capacity is used to fullest, most profitable advantage.



On truck equipped with conventional body and hoist, no extra payload can be carried. Body, hoist and load weight is concentrated on rear axles—high capacity of front axle is not used.

Model 66381 forward mounted Duo-scopic hoist, capacity 22 tons. Center or outrigger mounting optional. Model 12N series heavy duty contractor's dump body has weight-saving box-type bracing for maximum durability.

Your Galion distributor has all the facts.

Phone him today!

THE DUO-SCOPIC **GALION** ALLSTEEL BODY COMPANY · GALION, OHIO

DIVISION OF CENTRAL OHIO STEEL PRODUCTS COMPANY AA-1024

. . . for more details circle 188, page 16

Another Cleaver-Brooks boiler in action!

Portable steam with a PUNCH helps make bridge go up faster

American Bridge Division, United States Steel Corporation, teams Cleaver-Brooks 125 hp boiler — with advanced methods of bridge construction

• Piles for this new bridge at Wheeling, W. Va., were driven at a rapid rate because constant steam pressure from a portable boiler assures smooth, powerful hammer action. Fast-steaming, clean, smokeless operation means extra economy, too. Modern push-button controls assure a full head of steam in 30 minutes or less from a cold start. Variations in hammer sizes or steam requirements present no problem — boiler operates at 80% efficiency from full load down to 30% of rating.

Use Cleaver-Brooks boilers anywhere. Here, skid-mounted unit is conveniently placed next to crane pile-driver. Service connections are conveniently located. Set boiler on blocks . . . and you're all set to go.

More facts on this modern, high-efficiency, portable or mobile self-contained boiler

- **TWO SIZES:** 80 and 125 hp, 150 lbs. working pressure
- **GASOLINE ENGINE** or electric powered, light oil-fired
- **TRAILER OR SKID-MOUNTED,** all-weather protected
- **SELF-CONTAINED,** compact, heavy-duty plant
- **CONSTANT STEAM PRESSURE** through automatic low and high fire control
- **ALL-YEAR USEFULNESS** — besides pile-driving and extracting, use boiler for asphalt plant, ready-mix and winter concrete operations, thawing and miscellaneous heating.

For complete details write for bulletin "Modern Pile-Driving and Extracting," Cleaver-Brooks Company, Dept. C-395, E. Keefe Ave., Milwaukee 12, Wis.

Cleaver Brooks

BUILT WITH THE FAMED FOUR-PASS HIGH-EFFICIENCY DESIGN BY THE ORIGINATORS OF THE SELF-CONTAINED BOILER

. . . for more details circle 178, page 16

PURCHASE OF SECOND HAND MACHINERY

By Albert Woodruff Gray

A CONTRACTING firm in Florida purchased a steam shovel for a road construction job, the purchase contract providing for the delivery of "One used Marion Steam Shovel complete and in good working condition with street plates." The seller had also promised that the shovel would be equipped with $1,500 worth of new parts and would be in good repair and running order when delivered.

Upon receipt of the shovel the buyer wired the seller, "There is not one single new piece on this machine. Will not unload until you come."

Confident however that a fair adjustment would be made the buyer unloaded the shovel. No adjustment was made. The shovel was worthless for the purpose it was intended. The offer to return the shovel was refused and suit brought by the seller for an unpaid balance of $2,625 under the purchase contract.

The court held that the seller of this shovel was not entitled to recover, ruling that a buyer is entitled to an opportunity to inspect and use a machine without waiving his right to return it for misrepresentations by the seller.

The court added, however, that the seller in this instance had based his claim for a recovery on the law that there could be no implied warranty of condition, adaptation, fitness or suitability for the purpose or of the quality of a second hand article.

The Florida Supreme Court as an authority for its ruling that no implied warranties existed in the sale of second hand machinery referred to a case decided in the state of Washington which involved the sale of a second hand dredge.

There the court said of this law that the sale of second-hand goods carried no implied warranty.

"The general rule is that there is no implied warranty in the sales of second hand goods and machinery. This court has never intended to hold that everything said to induce the sale of a second hand article is seller's praise. To so hold would be to say that there could be no warranty upon the sale of a second hand article. If a person buys an article second hand, there is no implied warranty, but there may be an express warranty."

In another instance of this character less than two years ago, suit was brought in a Missouri court for an unpaid balance of $4,060 due under contract for the purchase of a grading tractor. The purchaser contended that the tractor had been warranted to be in condition for use in grading and that it was not fit for that purpose.

In its decision in favor of the seller the Missouri court rested its judgment on this old common law rule:

"A warranty that a second hand machine being rebuilt would operate as a new machine and would be adequate and capable of doing a particular type of work, would be an express warranty. The purchaser knew this machine was second hand and being overhauled. There is no such thing as an implied warranty of a second hand machine."

Uniform Sales Act

There has now however, been adopted in thirty-five of the states a Uniform Sales Act. The provisions of that statute relating to implied warranties which make no distinction between new and second hand equipment, in instances when the buyer depends on the skill and judgment of the seller, are,

"Subject to the provisions of this Act and of any statute in that behalf, there is no implied warranty or condition as to the quality or fitness for any particular purpose of goods supplied under a contract to sell or a sale, except as follows:

"(1) Where a buyer, expressly or by implication, makes known to the seller the particular purpose for which the goods are required, and it appears that the buyer relies on the seller's skill or judgment, ° there is an implied warranty that the goods shall be reasonably fit for such purpose."

The latest states to adopt this statute are Arkansas and Colorado, in 1941 and 1942, and this legislation by these states will undoubtedly be followed by others of the thirteen which have not yet made this statute their law.

In an action before the Federal District Court in Wisconsin, where this Uniform Sales Act is the law, suit was brought to recover an unpaid balance on a purchase contract in which the buyer set up as a counterclaim the expense it had incurred in repairing the second hand equipment purchased under this agreement.

In denying an application by the seller for judgment on the ground that no such defense could be maintained in the sale of second hand goods, the court said of the application of this statute to the implied warranty that this equipment was reasonably fit for the purpose for which it had been bought,

"Under the common law there was generally no warranty implied in the sale of second hand goods." Then referring to this recently enacted statute the court continued, "Looking first at the language of the statute we find no indication of any legislative intent to exclude second hand items from the coverage of the statute.

"The statute provides that there shall not be any implied warranty except in the instances set forth. Subsection (1), which concerns us here, requires (first) that the seller make known to the buyer the purpose for which the goods are required, and (secondly) that the buyer rely on the skill or judgment of the seller. Here there is no exclusion of second hand goods. This provision is consistent with an intent to include second hand goods on its coverage. Thus, it would appear on its face the statute does not exclude second hand items from its coverage.

"While the Wisconsin Supreme Court has not had occasion to construe the statute in this regard the question has arisen in other jurisdictions which have enacted similar legislation. In the great majority of these jurisdictions it has been held that the Uniform Sales Law does not exclude from its coverage second hand goods. This court feels that this is a proper interpretation of the statute."

REFERENCES

McDonald v. Sanders, 137 So. 122, Florida
Fairbanks Steam Shovel Co. v. Holt & Jeffrey, 140 Pac. 394, Washington
Nickerson v. Whalen, 253 S.W. 2d 502, Missouri
Uniform Sales Act, sec. 15
Standard Brands v. Consolidated Badger Cooperative, 89 F.S. 5, Wisconsin
Uniform Sales Act has been adopted in—
Ala., Ariz., Ark., Cal., Col., Conn., Del., D.C., Idaho., Ill., Ind., Iowa, Ky., Me., Md., Mass., N.D., Ohio, Penn., R.I., S.D., Tenn., Utah, Vt., Wash., Wisc., Wyo., Alaska, Hawaii. Mich., Minn., Neb., Nev., N.H., N.J., N.Y.,

● Sawing joints in partly hardened 20-in. concrete. Cut being made to a 3-in. depth with a 12-in. diameter diamond blade.

Summing Up on Joint Sawing for Heavy Airfield Pavements

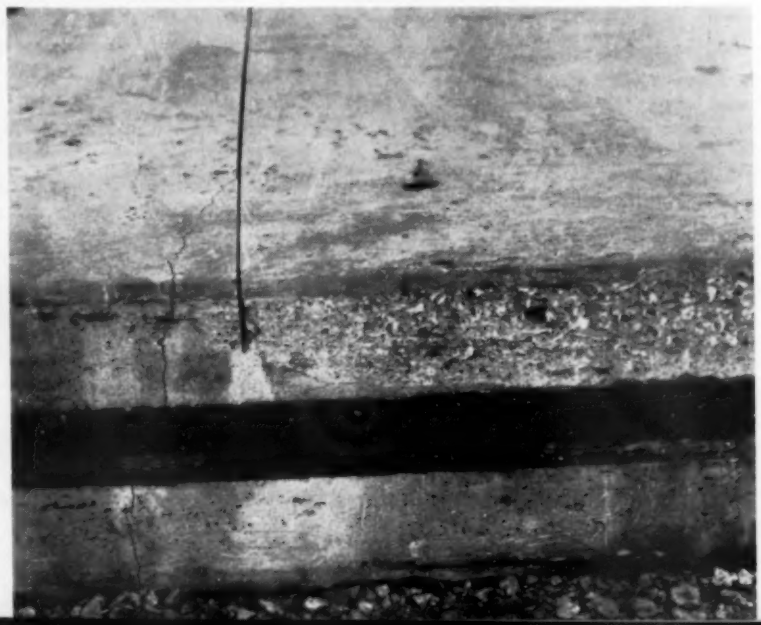
By Herbert B. Erickson
Corps of Engineers, Omaha District

CONTRACTION cracking in thick airfield pavements is usually more difficult to control than in thinner road pavements; as a consequence more care must be taken to control the time of sawing joints. Some highway departments have controlled contraction cracking in thinner pavements with control joints at 50 to 75 foot intervals sawed initially, and intermediate joints cut hours or even days later. In thicker pavements (12 to 20 inches) experience shows that all joints must be sawed as early as possible in the order of concrete placement if control is to be assured.

The time to saw has been the object of considerable concern and study, since sawing too early produces serious raveling in the joints, and late sawing usually results in uncontrolled cracks. In order to learn more about the best time to saw thick slabs in airfield pavements personnel of the Omaha District, Corps of Engineers, placed thermometers in the slabs and took temperatures hourly until visible contraction cracks were observed beneath the sawed joints. The results of these studies showed that the slabs must be cut before the internal temperature of the slab drops appreciably if control of cracking is to be assured. Temperature studies at different locations and during different seasons indicated that the time interval between concrete placement and the time the slab reached its peak in temperature varied considerably, consequently the cycle could not be used to develop a general formula for the optimum time to saw.

Since continuous temperature studies on a job to keep up with weather changes would not be practical, some other method of determining the proper time to cut joints was considered necessary. Trial sawing based on data from the temperature studies was the next method tried. The saw was placed on the surface of the slab as soon as the tires of the saw machine would not leave indentations and before the concrete reached its temperature peak. Using this method it was then learned that the saw cut gave the best indication of the condition of set of the concrete. Severe raveling resulted at the edges of the joint in concrete cut too early, when aggregate in the surface of the concrete was kicked out by the saw rather than being cut. A very smooth face in the saw cut indicated that sawing was being accomplished late. Early experience had shown that sawing late was usually accompanied by random cracks across the entire width of the paving lane, or by cracks which followed the saw cut most of the way across the pavement and then went diagonally to the edge. The short erratic cracks meant that sawing was slightly late and that contraction cracking occurred while the pavement was being sawed. When the

● Contraction joint sawed late — crack occurred during sawing. Note greater width of joint beyond point where erratic crack goes into joint. Saw cut started beyond limit of picture and completed at near edge.



Sawing Do's and Don'ts

- Saw joints in order of pouring.
- Joints must be cut before concrete temperature drops appreciably.
- Trial sawing with visual check on appearance of cut is best practical means of determining timing.
- Keep eye on weather. Most uncontrolled cracks have occurred during cooling rains or sudden temperature drops.
- Plenty of cold water on blades prolongs their life.
- Specifications should clearly indicate necessity of early sawing even if blades wear faster.

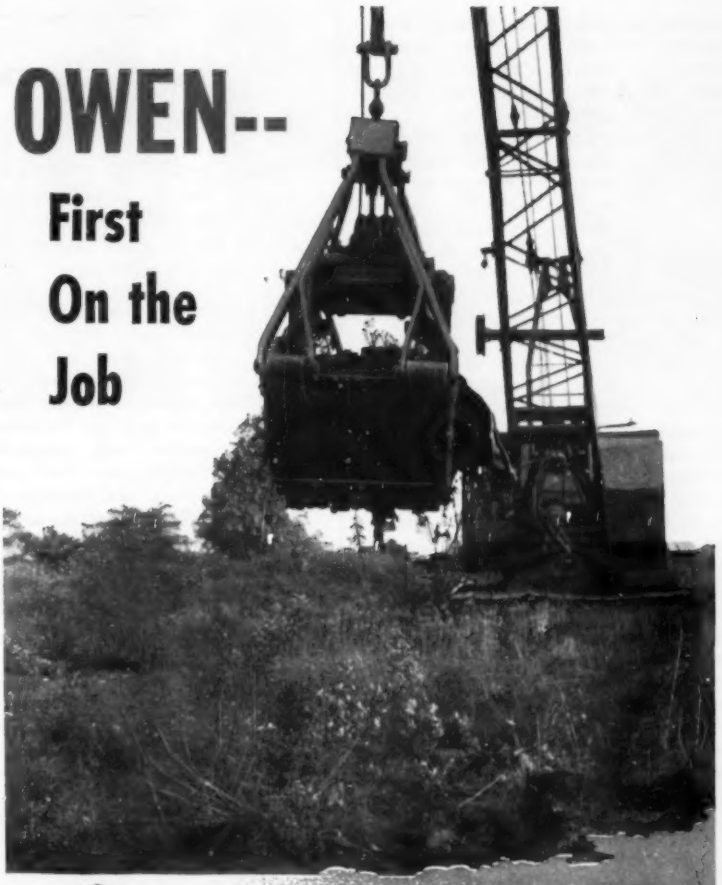
pavement section was reduced by the saw cut, the tensile stresses that had been built up caused sudden failure ahead of the saw cut which caused the short cracks which crossed the corner diagonally, missing the joint as shown.

Cool rains or sudden temperature drops were found to cause contraction cracks to occur much earlier than normal. When the weather forecast indicates the possibility of either occurring, sawing should be continued even with heavy raveling.

Pavements placed during the morning of a hot, dry day at Lincoln Air Force Base, Lincoln, Nebraska, reached maximum temperature in about 8 hours and showed visible cracks under the saw cuts 16 hours after placing. Concrete placed in the afternoon of the previous day did not reach peak temperature for 20 hours and no visible cracks were observed until after 30 hours. In both cases, contraction cracking was controlled by sawing the joints as soon as the saw could operate on the surface of the pavement safely without causing excessive raveling in the joint.

Sawing concrete early enough to assure control of contraction cracking causes diamond blades to have a shorter life than when they are used to saw hardened concrete. Water under pressure, used generously and kept as cold as practicable, provides lubrication and cooling which insures the best blade life possible. Manufacturers have designed new blades specifically for cutting "green" concrete which are giving better life in fresh concrete. The important thing to re-

OWEN--
First On the Job



An Owen bucket takes the first bite for National Engineering & Contracting Company on the 55th Street intersection of Cleveland, Ohio's multi-million dollar freeway.

One of their many Owen buckets breaks ground for the Horwitz Co. of Cleveland, Ohio at the opening ceremonies of Ohio's 241 mile, 326 million dollar turnpike at Peninsula, Ohio.

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. . . for more details circle 216, page 16

member in sawing joints is to get the concrete cut early enough to control contraction cracking, even though blade life is reduced, and specifications should set this out clearly.

The proper time to saw can be determined in the field closely enough by a conscientious saw operator or inspector by trial sawing. The saw's tires should not leave marks in the concrete pavement surface and the saw cut should not show a large amount of displacement of pieces of aggregate from the surface, although it can show some roughness in the faces of the cut and slight raveling at the surface. Large temperature drops and cool rains should be anticipated whenever possible since, at present, they are probably the major cause of uncontrolled cracking. The fact that sawing partially hardened concrete reduces blade life must be accepted, and control of contraction cracking given top priority when sawing schedules are established. Adequate supplies of cooling and lubricating water supplied under pressure, and the proper type of blades to fit the job requirements, are factors which will insure the longest possible blade life. If an erratic crack is observed near a joint location before the saw cut is made, that saw cut should be omitted. A saw cut equal to one-sixth the pavement thickness has been found adequate in controlling cracking.

Experiments on creep of concrete

Engineers concerned with the finer theoretical points of concrete behavior will be interested in an 8-page paper by Prof. A. D. Ross of King's College, University of London, in the June, 1954, issue of the MAGAZINE OF CONCRETE RESEARCH, published by the Cement and Concrete Association, 52 Grosvenor Gardens, London, S. W. 1, England. Title of the article, "Experiments on the creep of concrete under two-dimensional stressing".

Yale traffic course

Yale University offers a one-year course of graduate study in traffic engineering. It is open to engineering graduates from accredited colleges. Students are accepted on the basis of the character of work done in undergraduate courses or evidence of aptitude and interest. Classes begin September 19, 1955.

A number of fellowships offering up to $2,000 each are available for the Yale course. For details write Director, Bureau of Highway Traffic, Yale University, Strathcona Hall, New Haven 11, Conn.

Field Tips on Thick Concrete Sawing

(Data from Corps of Engineers, Los Angeles District)

Based on their experiences, Corps of Engineers personnel, the Los Angeles district, summarized certain field procedures which have proved satisfactory in sawing joints in thick concrete pavements. This general summary was presented at a seminar recently held for project engineers of the District.

Where it is practical, the District specifies sawed joints to obtain a smoother surface and more durable concrete performance at joints. Specifications require that the contractor shall be responsible for proper and adequate joints. Although joint thickness and shape have not been finalized, a single cut approximately ¾ in. wide is favored, except where a "V" or double cut is deemed more suitable. At Edwards Air Force Base, where a new 15,000-ft. P.C. concrete runway and supporting pavement were recently completed, sawed joints were 3-in. deep and ¾-in. wide. The runway was paved in 25-ft. strips and the only reinforcement was dowels at the longitudinal joints between strips.

The following are some of the techniques which have been found to be effective in minimizing uncontrolled cracking in concrete pavements.

Sawing Pattern. A grid pattern must be established for concrete sawing wherever possible. Nonuniform sections should be laid out and sawed in a manner in which uncontrolled cracks will not develop.

Temperature Variations. It has been found that large temperature variations between day and night, accompanied by low humidity and wind, are the periods when many uncontrolled cracks have occurred. The inspection forces should be alerted at the times this condition is forecast to adjust the sawing schedule accordingly.

Sawing Equipment. Only first class sawing equipment is approved. It should be of sufficient capacity to saw at the rate which is necessary at critical curing periods of the day. Placing of concrete should not take place at times when sufficient standby sawing equipment is not on the job. An attempt should be made to have the contractor furnish multiple blade equipment. The importance of high quality sawing equipment should not be minimized and its approval merits careful consideration on the part of the project engineer. This equipment should be checked with the same degree of attention that is given to concrete batch and mixing plant.

Contractor's Sawing Crew. It should be first ascertained that the contractor or subcontractor understands concrete sawing and has a foreman who knows and believes in proper and adequate sawing.

Sawing Inspection. A full time inspector shall be assigned to all major sawing operations. The inspector should be one with previous experience in concrete sawing who can determine and direct the contractor to saw at the proper time and in the correct pattern. It is necessary that this inspector is highly qualified, since a portion of the sawing will be done when the project engineer and chief concrete inspector are not on duty.

Saw at the Proper Time. The experience of the District shows that the elapsed time between placing concrete and the time sawing commences is from 7 hours in dry summer weather to more than 12 hours in winter weather. Experienced saw inspectors can determine the proper time for sawing after 2 or 3 days' placement and the type of weather that exists.

If the joints show no ravelling it is highly probable that the sawing is being performed too late. If a sharp edge joint is made, a careful inspection will generally show either random uncontrolled cracks or tension rips, or both. The proof that the sawing was performed on time is the absence of uncontrolled cracks or rips.

BEFORE Traffic bottleneck on steep grade on route SBI Route 116 between East Peoria and Metamora prior to widening of existing pavement.

AFTER Traffic bottleneck eliminated by construction of third lane for slow truck traffic.

Truck Laning Removes Illinois Bottlenecks

THE construction of truck lanes to speed the movement of traffic on steep grades is rather a widespread practice in mountainous states throughout the country. Almost unnoticed, the prairie state of Illinois also has wisely adopted this practice on a limited scale to improve the traffic capacity and safety on older roads.

As reported by the Illinois Division of Highways to ROADS AND STREETS, six such projects in the central and southern parts of the state have been completed in recent years and two more will be completed in 1954. Admittedly, Illinois has no extensive plans for truck lane work on a large scale; however, the steps taken are important enough to merit recognition and commendation as an example of the work being done in Illinois to solve its traffic problem.

BEFORE

Narrow two-lane pavement and sharp curve section on SBI Route 147 (Ill. 37) near Buncombe in Jackson County.

AFTER

Completion of third lane and resurfacing resulted in safer and faster traffic movement.

• A new million barrel portland cement plant for the Detroit area has been announced by Peerless Cement Corporation of Detroit, with production to begin late in 1956 or early 1957.

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Dig trenches, tank pits, bell-holes, foundations.

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LIFT FORK
Handle all kinds of unit loads on or off pavement.

BACK-FILL BLADE
Back-fill trenches, walls, abutments — level and spread.

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PRECAST THREE ON A BARGE

65-Ton 2-Lane Deck Slabs

● One of the six special barges equipped with re-usable steel forms, into which roadway slabs are cast.

Paper forms for pile encasement also helped expedite construction of 11,400 ft. Dauphin Island Bridge near Mobile

8 Pages of Job Methods

TWO major construction innovations by which the builders of the $3.5 million Dauphin Island Bridge across Mississippi Sound from the Alabama Coast are cutting corners and costs are:

1. Precasting the 34-ft. reinforced concrete roadway slabs in re-usable steel forms specially constructed on barges, so that the slabs set and cure enroute to the bridge site.

2. Utilizing paper forms for encasing the steel bearing pilings below and above the water line with concrete.

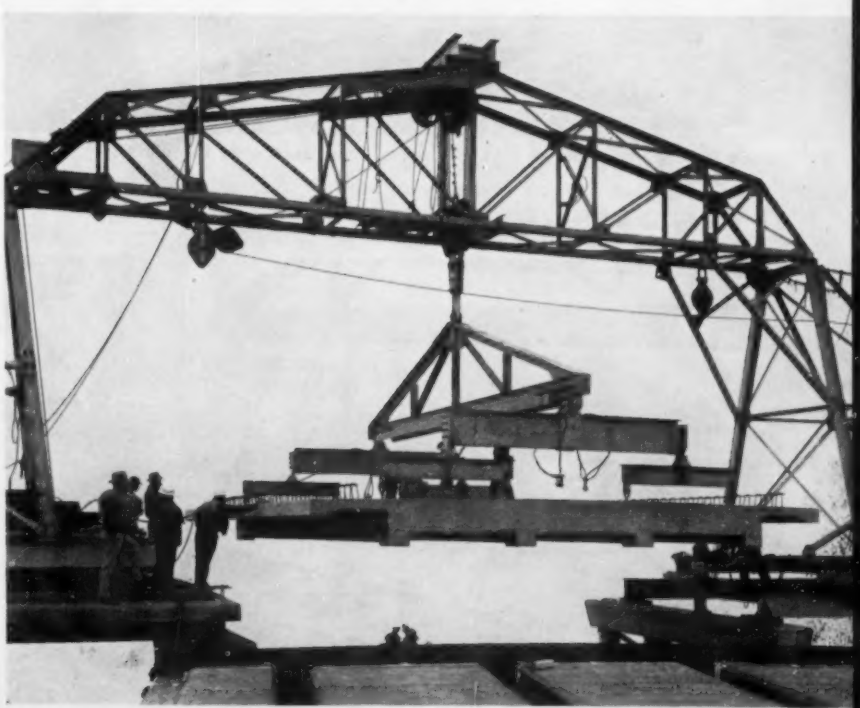
Blount Brothers Construction Company of Montgomery, Ala., and Kansas City Bridge Company of Kansas City, Mo., are joint contractors to the Alabama Highway Department for the construction of the 4.4-mile structure. It includes 2.165 miles of steel and concrete bridge, with a 210-ft. lift span having vertical clearance of 85 ft. The remainder of the structure is bulkhead fill and the roadway across adjacent islands and the Alabama mainland.

The bridge will connect the Southernmost end of Alabama Highway 163 at Cedar Point with Dauphin Island. The island is being developed under the Mobile Chamber of Commerce as a major resort area.

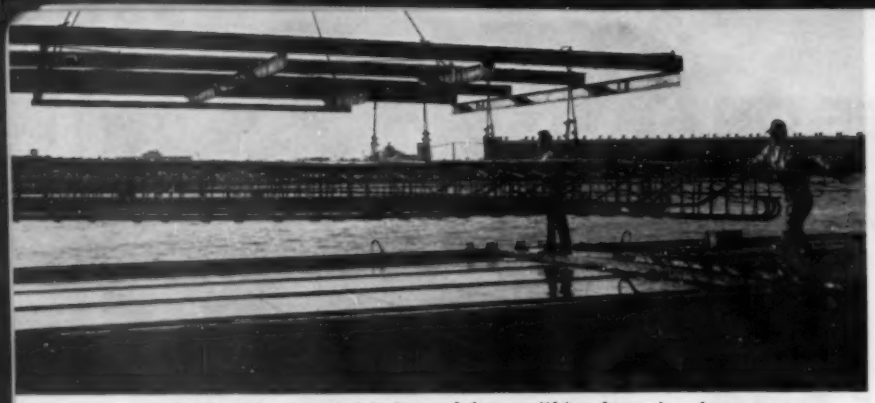
Designed for H-15-44 AASHO loading, the slabs are 29 ft. wide and carrying a 24-ft. roadway, two 6-in. curbs and two-2-ft. sidewalks.

342 Cast Slabs

In all there will be 342 barge-cast slabs in the bridge; three slabs will be cast in place. The slabs are 34 ft. long, Alabama's standard for reinforced concrete deck girders. Slabs are set on 23'3" poured concrete caps 3 ft. wide at the top, 2 ft. at the bottom, and 2 ft. deep, supported on 4 pile bents of 10-in. 42-lb. steel bear-



● Hoist lifts 65-ton roadway slab into place following 27-mile barge trip.



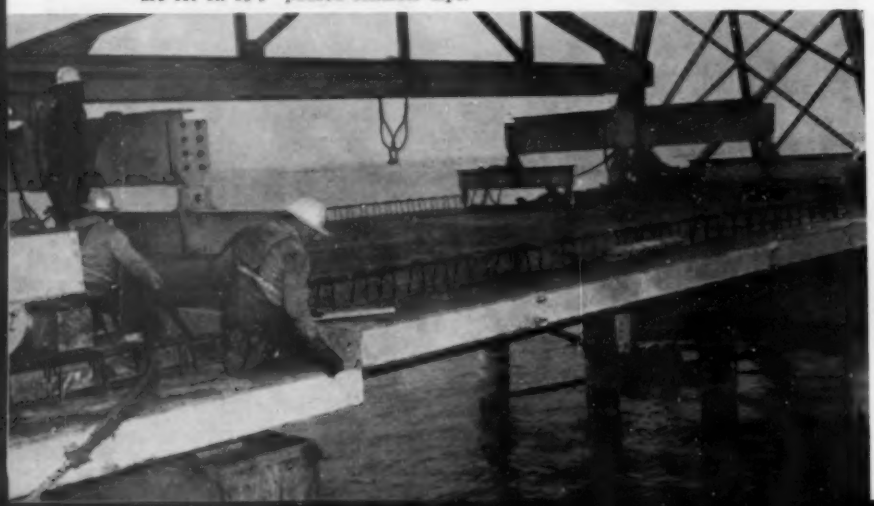
● Web of reinforcing steel is lowered from a lifting frame into barge as first step in the casing operations.

Major Equipment on the Dauphin Island Bridge Job

1 10" Hydraulic Dredge
2 35 Ton Wiley Floating Whirleys
3 38-B Bucyrus-Erie Cranes
1 820 Lorain Crane
1 77 Lorain Crane
1 L50K Lorain Crane
1 34 Lima Crane
1 25 Northwest Crane
1 22-B Bucyrus-Erie
1 6S 52 Link-Belt
1 116 Gallon Motor Grader
1 TD14 International Tractor
1 D6 Caterpillar Tractor
1 D4 Caterpillar Tractor
1 600' Gardner-Denver Compressor
1 500' Worthington Compressor
1 210' Gardner-Denver Compressor
1 210' Joy Compressor
1 160' Jaeger Compressor
1 125' Joy Compressor
6 Tugboats
1 90' Boom Stiffleg Derrick
3 Winslow Binabatches
1 28 S Mixer
2 16 S Mixers
2 No. 3 Vulcan Pile Hammers
2 50C Vulcan Pile Hammers
2 10B 3 McKiernan Terry Pile Hammers
3 No. 3 Pile Hammers
11 300 Amp Welding Machines
1 Motorola Radio Network
2 Sedans
3 Pickups
2 Flatbed Trucks
1 Dump Truck
24 Barges
1 Fleet Aluminum Skiffs w outboard motors

● Pouring one of the 29 x 34 ft. roadway slabs. Batch plant in right foreground.

● A pre-cast slab being fitted into place on the Dauphin Island bridge. Slabs are set on 23'3" poured concrete caps.



ing piles reinforced with structural steel sway braces above the water line. Most of the steel pilings, which are footed in sand, are 90 ft. or more in length.

Construction of the bridge began with the driving of the first piling in May, 1954, and completion is set for June 1, 1955. A peak force of over 300 workmen has been employed.

Development of the barge-mounted forms into which truck-mixed concrete is poured 27 miles from the bridge site, was worked out by the contractor and representatives of Irvington Form and Tank Company of New York, who built the 10 guage sheet-steel forms. Use of the ingenious forms built on the barges eliminates the problems of setting up a casting yard and casting in forms on shore, and of rehandling slabs onto barges for delivery to the site. It also eliminates the hazards of pouring in place in an open stretch of Gulf waters intermittently subjected to sudden and severe storms.

Slab Pouring Procedure

Six barges are used on the job. Three 29x34 ft. slabs, each weighing 65 tons, are poured on each barge by Radcliff Gravel Company at its main waterfront plant on the Mobile River in Mobile, this is 85 cu. yd. of concrete to the barge. In all, 9890 cu. yd. will be placed by Radcliff.

The Radcliff firm's mixing trucks make one of the shortest runs in construction history — about 75 ft. from the batching bins to dockside with a four to six minute interval for mixing. A Lorain 820 crane handles a 1-yd. Insley concrete bucket between the trucks and the barges. Slabs are screeded and belted, and cured with Hunt Process clear curing compound.

The concrete mix design includes air entrainment and also 135 lb. of flyash per cubic yard. Use of locally produced flyash as a cement replacement represents recognition by the Alabama Highway Department of this admixture, which is believed to produce considerable savings in construction costs, and also provides a concrete more resistant to sea water.

The form clean-up starts as soon as a slab is lifted out of a barge at the bridge site, and turn-around time for a barge is about nine days. Slabs are set in place five to six days after pouring.

Steel reinforcing for the precast roadway slabs is tied into cages in special false forms on the bank of the Mobile River. The entire cage for one slab is lifted from the false form and lowered into place on the barges by a Bucyrus-Erie 38-B crane. The barges are then towed to the

Radcliff plant where the concrete is poured.

At the bridge site a slab-placing traveler, designed specially for the project and equipped with a Skagit Model G-70 hoist, travels on its own tracks as the bridge grows. It reaches down between the pile bents and connects its lifting beams to eight lifting eyes screwed into coil anchors cast into the slab. Those accessories are supplied by Superior Concrete Accessories, Inc.

Just before the hoist takes the load, air pressure is applied through large-diameter hoses placed under the soffits to break the bond and pop the slabs loose from the forms. The hoist lifts the slabs above the level of the roadway, revolves through 90 degrees, then lowers into place on the caps. In this way it is possible to get the barges between the bents which are 34 feet apart.

First one end slab, then the other, and finally the center slab are lifted from the barge, in that order, so that the barge remains as nearly level as possible during the lifting operation. The application of the bond-breaking air pressure to the girder soffits is the secret to the success of the entire operation. Average time for lifting and setting a slab in place is 50-55 minutes, including drilling holes and placing dowel pins into the caps on the fixed end of each slab. Curbs are poured after the slabs are placed.

A factor in the piling encasement procedure is a job-developed air and water jetting device. This device permits seating each concrete encasement 2 ft. below the ground line, which varies from 1 ft. to 16 ft. below the water line. Development of the device made it more efficient and economical to use the 20-in. diameter circular encasements than the standard 16-in. square encasements.

● Pouring concrete into 20-in. Sonotube casings to encase the steel H-pilings. These paper forms have eliminated external curing, and keep fresh concrete from exposure to sea water.

Each paper form or Sonotube is fitted with a wooden bottom, shaped to fit the H-shaped piling. The form is then set in the jetting cage which extends 2 ft. below the bottom of the tube and which has six jets. The ground line is sounded and the jetting cage, Sonotube and reinforcing spiral slipped over the upper end of the piling.

Encasement concrete pouring begins with the bottom of the Sonotube just above the water line, and the weight of additional concrete, carries the device to the bottom as pouring continues, consequently. All concrete is placed in the dry. A mandrel trips the jetting cage as it reaches the ground line. When the full encasement, its length pre-determined by the sounding, has been poured, it is topped off 1 ft. above the water line and the jetting cage is recovered.

Presence of the sway braces makes it more efficient to pour the remaining part of the encasing concrete, which reaches to within 1 ft. of the top of the piling. This is a second operation, since the Sonotubes must be slit and notched to fit these braces. The paper tubes are easily cut with an electric circular hand saw, fitted over the sway bracing, and then clamped with 1¼-in. iron ratchet type column clamps, into position around the pilings.

Another advantage of the paper forms is that they eliminate external curing and they also keep the fresh concrete from exposure to sea water. The Dauphin Island Bridge contractors believe they have successfully solved the problems that heretofore prevented use of such forms for underwater construction despite their obvious advantage for such work over square encasing forms.

Concrete for the piling encasements and the caps is poured from concrete barges working at the site.

The lift span over the Intracoastal Waterway through Pass Aux Herons, to be supplied by American Bridge Company, will have a horizontal clearance of 200 ft. The structural steel lift span towers rest on 9'3"x28' steel caissons filled with concrete, and conventional bridge piers. Each caisson has nine 42-lb. 10-in. bearing piles and each pier footing has 36 such steel bearing piles.

Bridge railing will be an Armco

(Continued on page 89)

● Piles are encased from below ground line with concrete poured in 20-in. diameter Sonotubes, one of the first such applications of these circular forms for encasing pilings under water.

7,100-Lb. Ball

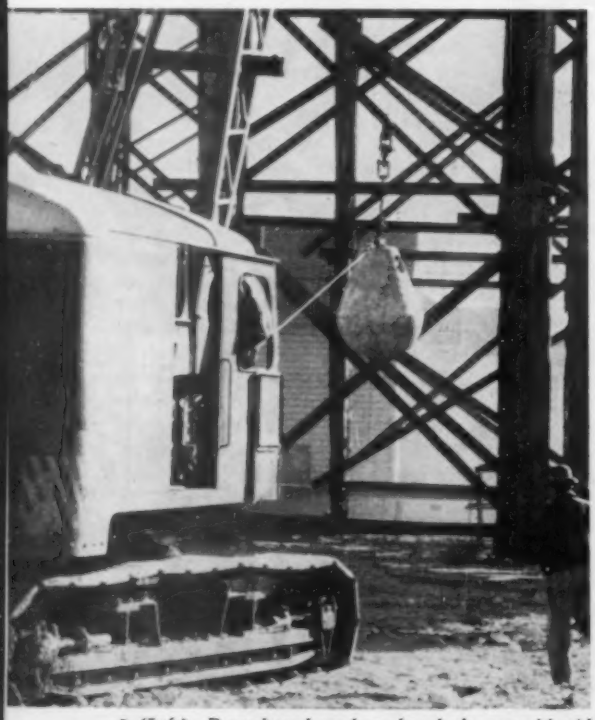
Makes Quick Work of Concrete Viaduct

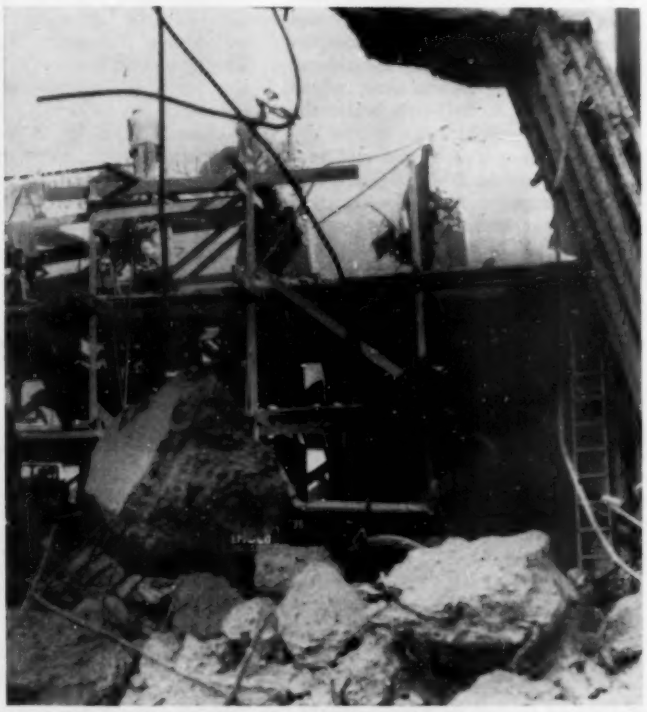
● Close-up photo of the huge "skull-cracker" showing relative size next to workmen.

DROP-BALL demolition of reinforced concrete bridges can be slow and difficult, but not when using a heavyweight 7,100-lb. "skull-cracker" like that built and used by Joseph D. Ballinger and Co. of Oakland, California.

With his special drop ball, Ballinger was able to demolish 235 cu. yd. of reinforced concrete per day on a recent contract. The structure removed was a reinforced concrete viaduct with 54 x 44 ft. deck slabs and 35 ft. piers having 5 ft. caps. It was part of the old distribution structure near the Bay Bridge in Oakland, now being reconstructed and modernized.

Believed to be of record size, Ballinger's drop ball is not only noteworthy for its weight, but also for its unusual cross-section. Made of cast





● (Left): Bents here have been knocked over with side blows after breaking up the deck. (Right): Primary demolition completed.

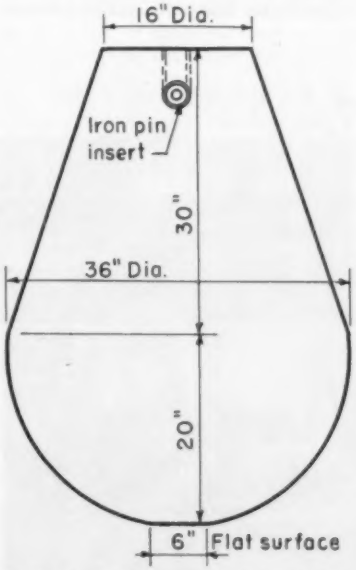
● How Ballinger toppled over 35-ft. piers with his heavyweight ball.

● Viewing the demolition "after the ball is over."

steel, it is roughly pear-shaped with flat top and bottom faces and rounded sides. Maximum diameter is 36 in. at the two-thirds point, from where it tapers to 16 in. at the top and to 6 in. at the bottom; total height is 50 in. The cross-section was thus proportioned so that, when dropped vertically, the ball would consistently land in a plumb position on its flat base for maximum impact effect.

For crane attachment, the ball has a ¾-in. cable sling about 4 ft. long. One end of the sling is fastened to a heavy iron pin inserted through a horizontal shaft at the top of the ball. The other end is tied to the crane cable by a steel thimble. A flexible ball and socket joint with anchor shackles on the crane cable has effectively minimized undue stress in swinging and dropping the ball.

Most of the primary demolition, knocking down the slabs and piers, was done with the ball hung from a 75-ft. boom on a Northwest Model 60 crane. According to T. J. Matthews, superintendent, the slabs were easily broken into large fragments on ball drops of 30 to 40 ft. Once the slabs were down, the piers were toppled over by side blows, struck by pulling the ball toward the crane with a tag line and releasing it. Secondary breakage of large fragments into truck-load size then followed, either by the big ball or by lighter weight drop balls.



● Sketch of Ballinger's steel drop ball.

Precasting Deck Slabs

(Continued from page 87)

type flexbeam hand rail with structural steel posts bolted to the outside of the spans. Four fishing ramps outboard from the bridge proper are being provided and there are two "humps" for small boat clearance. The northernmost gives 16 ft. vertical clearance at mean low water and 32 ft. horizontal clearance. The hump south of the lift span gives 26½ ft. vertical clearance and 40 ft. horizontal clearance. The slab over this hump will be cast in place. Parking ramps are provided on each side of the lift span with the roadway slab adjacent to these ramps being of special design and poured in place.

Considering the large labor force spread over four miles of bridge and causeway, and the many types of work underway simultaneously, the contractor has achieved an excellent safety record. Wearing of hard hats and life jackets is required.

Communication is maintained through the use of a Motorola network connecting tugs, major operations, office and superintendent. Portable sets are available for isolated operations.

The bridge was designed by the Alabama Highway Department, John W. Chambers, chief bridge design engineer. Fred A. Robison is in charge of the State's staff at the site.

Frank W. Currey is general superintendent of construction for Blount Brothers-Kansas City Bridge, Russell Thompson is field superintendent, W. D. Tryon, project engineer, Bruce Johnson, office engineer, F. W. Dushane, office manager, W. W. Morton, master mechanic, S. S. Smith, carpenter superintendent and H. H. Naylor, superintendent of slab casting.

Subcontractors and Suppliers for Dauphin Island Bridge

Ready mix concrete — Radcliff Gravel Company
Sand and gravel — Radcliff Gravel Company
Cement — Ideal Cement Company
Reinforcing steel — Orleans Material Company
Structural steel — Mobile Steel Company
Timber piles and treated timber — Thames Lumber & Mfg. Company
Handrail and guardrail — Armco Drainage & Metal Products, Inc.
Sonotubes — Sonoco Products Company
Steel bearing piles — Tennessee Coal & Iron Div., U.S. Steel
Curing compound — Hunt Process Corporation
Lift span structural steel — American Bridge Div., U.S. Steel
Lift span electrical — G. R. Wood & Company
Lift span machinery — Steward Machine Company
Reinforcing placing — Gulf States Steel Company
Roadway work — Farmer Construction Company
Shell fender — Radcliff Gravel Company
Seeding, sprigging — R. C. Jackson

● Part of Denton's "mothball" fleet — an Allis Chalmers HD9 bulldozer, Galion roller and Allis Chalmers HD5 front-end loader, protected by "VisQueen" plastic.

Plastic Tarps For Overhauled Equipment

AT A COST of less than seven dollars per machine, a Detroit contractor protected his overhauled equipment this last winter with plastic sheeting, as pictured here. So widespread and complimentary have been the remarks over this idea from visitors to this contractor's yard, that the ROADS AND STREETS editors hasten to pass the idea along to the contracting fraternity.

The contractor is Denton Construction Company, Detroit, whose modern shop was described in a recent issue.* The protective material was supplied by Visking Company of Terra Haute, Indiana. According to Leet M. Denton of the Contracting firm, the roll of material was 16 ft. wide by 400 ft. long and was purchased at a cost of $147. One-third of the roll was used during the winter to cover seven machines. This would bring the cost per machine to about $7.

The economy of the idea is further emphasized by the fact that Mr. Denton expects to roll up this tough, durable material and reuse it indefinitely. The labor involved in handling is negligible, and readers can figure out for themselves the advantage of keeping snow and ice off of machinery after rebuilding and repainting.

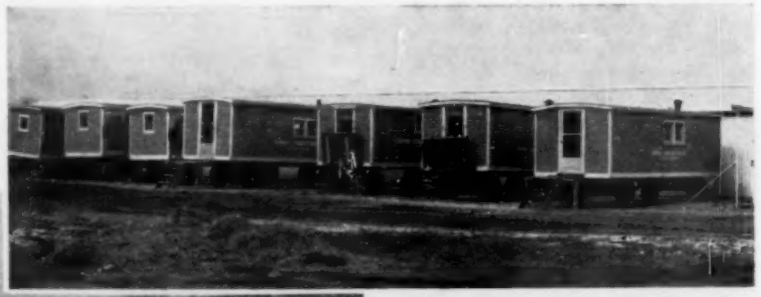
The Denton firm, a leading concrete paving contractor in the Detroit area, is well known for its all-out policy of completely renovating all equipment each winter. "In the past," reports Mr. Denton, "we have done a beautiful job on our machines, only to store them out in the elements for the rest of the winter. These simple coverings seem to be the answer."

In supplying pictures to the editor, Mr. Denton also sent along this photograph of a row of trailers his organization has built and maintained for use in the field. The trailers which make a good appearance and are spacious and comfortable, are part of the policy of complete mobility of the company in its field operations. The trailer on the far right of the picture is the first one the firm made, and is now eight years old. The ones with end doors are office trailers.

Explaining the origin of the trailers, Mr. Denton says, "When we stopped hauling cement by sack several years ago, we were left with a number of flat-bed cement trailers. We conceived the idea of using them up in the construction of shanties."

The trailers are variously used for field offices for the contractor, field offices for state inspection and testing personnel, and storage space for lubricants, parts, small tools, etc.

*See "Contractor Builds Showplace Shop," pages 74-75, ROADS AND STREETS, September, 1954.



● Some of Denton Construction Company's shop-built field office and parts trailers.

● Plastic wrapped scrapers including two Tournapuls (D roadsters) and one new Euclid S-7 scraper. Average labor per machine, two men for one-half hour each to tie down the material.

Big Rocks? We Skidded Them Along

HOW to dispose of a pile of large limestone boulders economically was one of the problems encountered by the J. C. Watson Construction Company of Dallas, Texas, on a recent earthmoving contract. The job called for moving 35,800 cu. yd. of dirt and rock in preparation for the widening of Marsalis Avenue to make way for a new 6-lane boulevard in Dallas.

Although the "problem rocks" could have been drilled and blasted in the conventional manner, contractor Watson found that this method would substantially boost his costs for the job. The high cost of insurance for blasting (made even higher because homes closely surrounded the area), plus the additional expense of moving in a power shovel to load the material after it was broken up, caused him to search for another means of removing the boulders.

Skidding Method

He decided that the simplest and most economical solution was to drag the stone behind his D Tournapulls. In doing this, the operators first loaded their scrapers with one or more of the smaller rocks. Then, using old pieces of cable, they dragged the large pieces to the dump. Round-trip time for the operation averaged 20 minutes over a cycle distance of about one mile. This novel application of equipment combined with good weather not only helped Watson hold his costs down but kept the job ahead of schedule.

The earthmoving work involved the moving material (primarily existing road surfacing and dirt with a large percentage of tough limestone) from more than one mile of the new roadway, hauling an average distance of one-half mile, and wasting the loads as fill in an area which was then graded for new buildings. Equipment used included three model D Tournapulls, an International HD 15 and a Cat D 7 dozer as well as No. 12 motor grader.

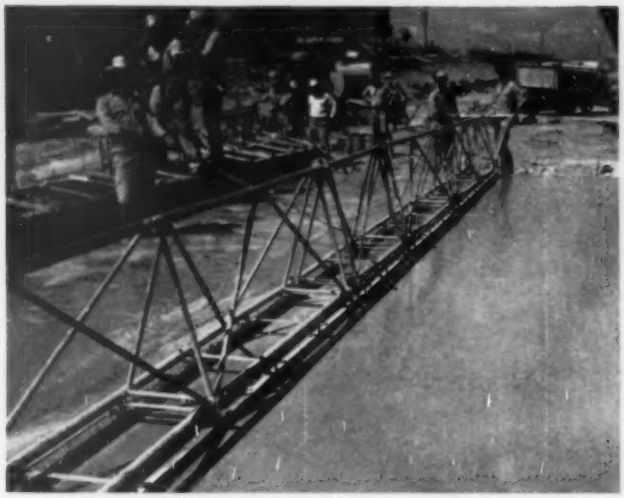
During the first eight working days the Watson Company moved 10,000 cubic pay yards of material averaging over 200 loads per 9-hour day; this despite production slow-up and interruption caused by intermittent flow of local traffic. The record number of loads was 538 dirt loads (no rock) on a 1,000-ft. haul during a 10-hour day. Watson estimated that his hauling average for the job was 5 yards of pay rock or 6 yards of pay dirt per load.

● Old pieces of cable were used to lash boulders behind scrapers which were first partially loaded with smaller rocks.

Watson sub-contracted this dirt work amounting to 35,800 cu. yd. for $44,000 from C. A. & J. W. Vilbig, prime contractor.

● The limestone boulders were spread along the banks of a creek and later covered with lighter material to fill and level property for new building sites.

Aluminum Screed for Bridge Decks



● Special strike-off screed used in widening a Texas highway bridge to provide an additional 45-ft. (3 lanes) of deck width.

THE finishing of concrete bridge decks is a job that has to be done carefully today, in order to insure an even, high-speed surface having a quality equal to that of the adjoining pavement. The problem is especially important with small spans, where there has been a tendency in some quarters to neglect the finishing operation.

Many devices have been tried by contractors to do the finishing well and economically. An example is the novel finishing screed pictured here. Built and used by Dean Ward Company of San Antonio and New Braunfels, Texas, the unit was observed in action on the widening of a bridge on U. S. 81 near Selma, Texas, during 1954.

The unit consists of a 45-ft. truss made of structural grade aluminum pipes. The strike-off members at the bottom are channel sections, adjustable vertically by the use of steel bolts to allow the screed to conform to the desired camber.

Two or more operators, working at the ends, oscillate the screed in a direction along its axis, gradually moving it across the width of the roadway and keeping the screed parallel with the bridge curb at all times. Movement of the screed across the roadway may be assisted by a cable fastened at the base of the screed near each end, as explained by Randall B. Alexander, bridge engineer of the Texas highway department.

The two striking members at the base of the screed are spaced apart sufficiently to give the screed stability and reduced tendency to overturn.

The aluminum construction has the advantage of providing a unit which is light and much easier to handle, than if constructed of steel, reports Mr. Alexander. However, it does have a tendency to "ride" the concrete and to be lifted off of the headers at the ends of the span. When this trouble is encountered the screed is sandbagged or otherwise weighted along its base. Even with this added weight, the aluminum unit has proved to offer considerable advantage over steel screed, since the weight is concentrated at the base, helping to prevent tilting as the screed is operated.

This type of screed is reported to have worked very satisfactorily from the standpoint of the engineers. It is especially adapted to use on the longer spans, where the added weight of a steel screed would materially increase the difficulty of finishing.

Getting most out of your streets

No community has to put up with the traffic problem, says the Chamber of Commerce of the United States. Practical remedies are available, many of them simple, relatively inexpensive.

In a recent study entitled "How to Get the Most out of our Streets," the Chamber points out that even with a greatly accelerated program of rehabilitation, it would require many years to bring our street systems up to reasonable standards for modern traffic.

"The bulk of our present facilities," the study maintains, "will have to suffice for a long time to come. . . . The main challenge today is to extract the full potential capacity from the facilities we have now."

This challenge, the Chamber says, can be met by scientific determination of traffic needs and the use of skilled traffic engineering techniques.

Here's a sampling of the Chamber's many specific proposals:

1. Directional control of traffic by means of reversible lanes and one-way and reversible one-way streets. Traffic capacity of a 50-foot downtown street may be increased from 1,000 to 2,200 vehicles per hour by making it one-way and eliminating parking.

2. Staggered work hours to reduce the peak hour transit load. Staggered work hours for federal employees in Washington cut the number of rush hour transit passengers by 50 per cent.

3. Coordination of traffic signals to enable traffic to proceed for prolonged distances without stopping. In Atlanta, coordinated signals on a one-mile stretch cut rush-hour travel time from 10 minutes to four minutes and reduced accidents by 30 per cent.

4. Improved transit service. Example: Cities using express buses between suburbs and downtown greatly increased use of public transit by saving passengers time. As use of public transit is increased, the number of autos on the streets is reduced.

Look under the hood!

On now – Truck Event of the Year –

HOODS UP SHOWDOWN!

A new type short-stroke engine design is revolutionizing truck performance. Ford, and only Ford has it in every model!

It's the automotive news of the year! First the car industry goes short-stroke V-8. Now the truck industry begins to follow suit. Small wonder! This new engine design increases piston ring life up to 53% . . . saves up to 1 gallon of gas in 7 . . . reduces engine friction as much as 33% for *more* usable power . . . gives longer engine life.

Ford—pioneer in V-8 truck power—has had Short Stroke V-8's on the road for three years. Today, *only* Ford offers an "on-the-job" tested, money-saving Short Stroke engine in *any* truck model you choose . . . with 4 Short Stroke V-8's and a Short Stroke Six.

Look under the hood! Be sure your next truck doesn't have an old-type, *long-stroke* engine that may be outdated before it earns its keep. Get the facts at your Ford Dealer's Hoods Up Showdown . . . now!

Short Stroke power to roll the heaviest loads on long or short hauls with amazing speed and economy. New Ford T-800 Tandem Axle Big Job with 170-h.p. Short Stroke V-8. Power Steering *standard*. New 11,000-lb. front axle at extra cost. 40,000 lbs. GVW, 60,000 lbs. GCW.

FORD

Triple Economy

TRUCKS *THE MONEY MAKERS FOR '55*

. . . for more details circle 187, page 16

Job and Equipment Ideas

● One way to tamp back of a wall.

● Tournatractor used to bury rubbish in Chicago.

Novel backfill tamping method

As a rapid and effective method of compacting earth around foundation walls, Swinerton & Walberg, contractors for the big new Western Electric Co. Distributing House at San Leandro, California, made up angle iron braces to support planks for wheel runways and then, hanging these over the inner side of the wall, ran a mechanical tamper over the work to comply with specifications.

The method is of interest to engineers and contractors in the highway field, where a prevailing problem is that of getting proper compaction back of bridge retaining walls and around culvert structures.

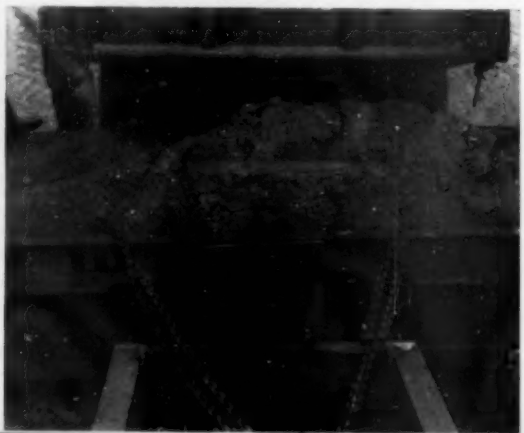
Dozer with special apron cleans up unsightly rubbish

Pictured is a Tournatractor, which was used recently by Chicago city officials to clean up unsightly areas such as rubbish-strewn vacant lots. A point of interest is the use of a lightweight framed type apron at the top of the dozer blade for handling bulky piles which loom high and would otherwise spill over onto the machine. The unit proved effective as a means of digging a hole, pushing the accumulation in, burying it and leveling the lot.

Spreader box mounted on motor grader

At jobs in narrow side-roads and blind lanes, the Colorado State Highway department has had much success spreading sand, gravel or patching seal aggregate as here illustrated. The 1½-yd. spreader box is held by bolts and chains to the front end of an Austin-Western 99 grader while a pair of laborers assist the coverage by scooping sand out over the road as the rig progresses. The main advantage, according to G.E. Lee, foreman at Grand Lake, Colorado, lies in the fact that the grader operator has good visibility at all times plus easy and complete control in both directions.

● Shovelers throw sand to either side while spreader drops material during Colorado maintenance operations.



● A spirit level mounted up on a frame — designed to help the grader operator know when his blade is absolutely level.

Leveling frame designed to help blade operator

Pictured here is a rather unusual device which is said to have helped the operator do an accurate tight-blading job. The motor grader was used by Reith Riley Construction Company, of Goshen, Indiana, on a test road project built in 1953 on U.S. route 31, north of Columbus, Indiana. Possibly its origin is due to the special control aspects of the project, requiring special cooperation between the contractor and the inspection and testing personnel of the Indiana state highway department.

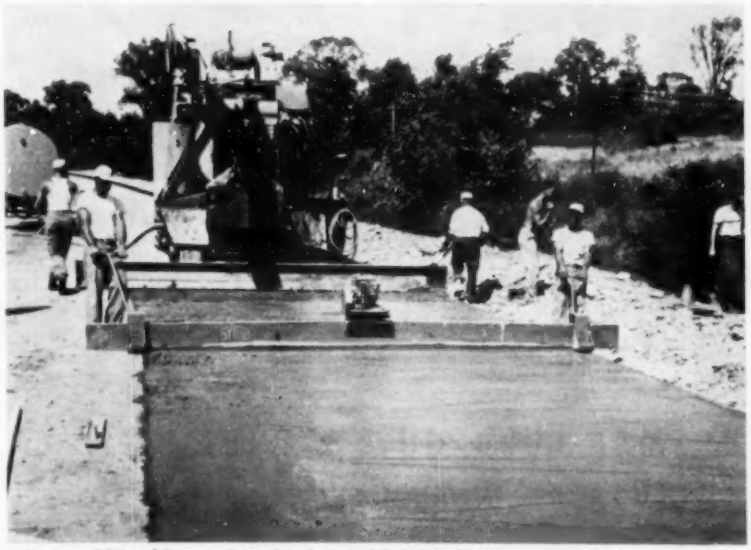
As shown here, the device consisted simply of a tubular steel frame, welded on the grader blade to provide support at operator's eye height for an ordinary carpenter's spirit level.

(Editor's note: We know some grader operators who would snort at such a new-fangled gadget, gradermen being proud of their skill.)

Creeper lane screeded

The Pasquale Construction Co. of Endicott, New York, was awarded a contract for constructing in a concrete third lane on both slopes of a rather long hill near Chenango Forks, New York. Company executives wondered just how they would finish the surface of the 14-ft. lane. Since it was a rather small job, they realized it would not be too practical to bring in their self-propelled road finishing machine. Neither would it be very economical to just slide a 2x4 screed back and forth as is often done on very small jobs.

A vibratory screed was chosen because of its easy portability and economy. The Stow "Power Pak" unit used consisted of a 2-hp Briggs and Stratton engine and a vibrating head. This unit did a satisfactory finishing job and easily kept up with the paver, requiring only two men as the screed was pulled up the hill. Any rough spots were touched up with hand trowels and broomed.



● Long uphill 3rd lane on New York state job finished with a Stow screed.

● Peeling up old gravel for re-use in Dane County, Wisconsin.

Road gravel stripped for re-use with scraper

Pictured here is a method used by Dane County (Wis.) highway department to strip old gravel off of its county roads for re-use on shoulders of widened and modernized road sections.

The relatively thin and highly compacted material is shown being peeled up with the cutting blade of an International Model 55 Payscraper, push-loaded with an International TD-24 tractor. Two such scrapers were used for this procedure, between other various duties as part of the county's fleet.

Personals

R. A. Bossy, expressway engineer for the San Antonio expressway system, has been appointed engineer-manager of the Fort Worth expressways. Robert O. Lytton, assistant expressway engineer, becomes expressway engineer at San Antonio.

● Retiring commissioner W. P. Curlin of the Kentucky department of highways, with testimonial book containing signatures of 5,000 state highway employes. At left is M. W. Tinder, new commissioner.

Clayton L. Davis has been appointed Technical Service Director of Universal Atlas Cement Company. He succeeds the late Earl R. Bryant.

Mr. Davis, who has served Universal Atlas since 1930, has long been active in the American Society for Testing Materials. He is a member of Committee C-1 on Cement and of Committee C-9 on Cement and Concrete Aggregates. For Committee C-1, he serves on the following sub-committees: Sponsoring Committee on Masonry Cement; Chairman, Working Committee on Methods of Tests for Air-Entrainment; Sub-Committee on Cement Reference Laboratory; Working Committee on Coordination of Methods of Test; Working Committee on Strength.

Sam Steigerwalt, County Engineer of Story County, Nevada, Iowa, was the first of several to receive 25-year service awards by the Iowa County Engineers Association, at its recent annual meeting at Ames. He has served 41 years in highway work in Iowa. Floyd Brown, president of the Association, officiated at this meeting where plaques were also awarded to L. M. Clauson, deputy chief engineer, of the Iowa Highway Commission, and to 28 other county men.

Allan, Piper advanced by Cement Association

James D. Piper has been named Vice-President for Promotion and W. D. M. Allan Vice President and Secretary of the Portland Cement Association.

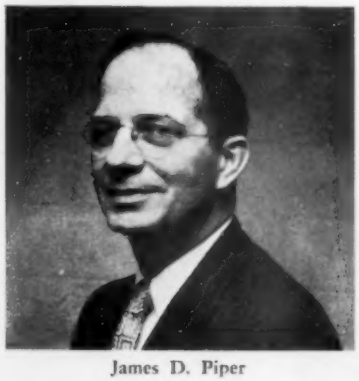
Mr. Piper, who succeeds Mr. Allan as Vice President for Promotion, has been the Association's district engineer, in Texas. He will supervise promotion activities of the Association throughout the country, including the work of 29 district offices serving 46 states, the District of Columbia and British Columbia.

W. D. M. Allan

Mr. Allan, a veteran of 36 years with the Association, has served as Vice President for Promotion and Secretary for the past three years. In his new position he will direct special activities.

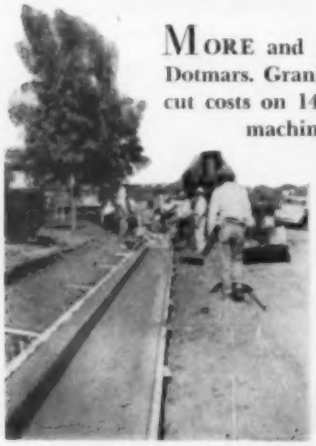
Mr. Allan joined the Association's field staff in 1918, becoming successively manager of the Cement Products Bureau, Director of Promotion, and Vice President for Promotion and Secretary.

Mr. Piper joined the Association in 1937 as a structural engineer at Oklahoma City, subsequently holding a similar position in the Austin (Texas) office. Following 30 months' South Pacific duty with the Seabees during which he rose to Lt. Commander, he returned to serve PCA in structural and highway work in Texas.



James D. Piper

DOTMAR CURB, GUTTER and SIDEWALK PAVERS *are Cutting Costs Coast to Coast!*



MORE and more contractors are cutting costs with Dotmars. Granite Construction Co., Watsonville, Calif., cut costs on 14 miles of integral curb and gutter with machine shown. Pays for itself in first mile of paving. Lays 5 to 10 lineal ft. per minute. Any shape curb or gutter. Greater concrete yield. Simple extension for paving sidewalks. Send for Bulletin 53.

Ask the Man Who Owns One.

DOTMAR AIRMITE HAMMER

Weighs only 3½ lbs. 7" long. Fits hand like a pistol. Power like a cannon. For drilling concrete, shipping, caulking, riveting, sheet metal cutting. Only $49.75. Send for Bulletin 154.

Dotmar INDUSTRIES Inc.

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. . . for more details circle 263, page 16

A Big Grader for Less Money

ADAMS "440"

A husky 100 hp. machine that offers a new value in the heavy-duty class

costs you less to own, less to operate

The Adams "440" is designed for owners who want heavy-duty capacity and performance, yet must keep a sharp eye on costs.

This powerful machine handles a wide range of heavy-duty applications: road construction and maintenance—bank sloping—ditch cutting—scarifying—sub-grading—road mixing—bull-dozing—snow plowing, etc.

Like all Adams Motor Graders, the "440" features an exclusive combination of time-saving and work-producing advantages: 8 Forward Speeds, up to 25 mph.—3 Creeper Speeds, ¼ to 1¾ mph.—4 Reverse Speeds, up to 13 mph. . . . plus Easy-Shifting Constant-Mesh Transmission—Dual Braking System—Rubber-Mounted Engine.

Ask your Adams dealer to demonstrate how the "440" can speed production and cut costs—*for you!*

ADAMS DIVISION, LeTourneau-Westinghouse Company • Indianapolis, Indiana

Easily handles all average road building

High-speed mixing and spreading of blacktop

Make your next motor grader an

ADAMS

DIGEST of Current Engineering Literature

By JOHN C. BLACK, Associate Editor

Four-way stop signs — right and wrong uses

Value of the "four-way stop" as an accident preventive depends primarily on traffic volume; practical limits of usefulness in rural areas are between 450 and 800 vehicles entering the intersection from all directions during an average hour of any six-hour period of an average weekday. For urban areas the lower limit is 650 vehicles. This is the general conclusion of State traffic authorities in Illinois, where four-way signs have been used for many years. The system is considered an intermediate step between the conventional two-way stop control and traffic signal control. It is inexpensive compared to modern signal installations, and in many cases has provided solutions to complicated problems in addition to reducing accidents.

Surveys of motorist opinion and questionnaires to traffic officers both brought major endorsement, but the strongest argument comes from statistics.

"A state-wide before-and-after study of the accident experience at 24 intersections on state highways recently converted from two-way to four-way stop control has been completed. The periods of study ranged from one to two years *before* conversion, and from one to two years *after*.

"During the *before* periods, a total of 303 accidents of all types were reported, and the average rate per million vehicles entering the intersection was 4.0; *after conversion*, only 213 accidents were reported, and the average rate was 2.2.

"These figures represent reductions of 29.7 per cent in all accidents and 45 per cent in rate, respectively. The reduction in accidents was accomplished in the face of an approximate increase of 20 per cent in traffic volumes through the intersections, which increase is reflected in the low volume-accident rate of 2.2.

"The noteworthy item from the study, however, was the reduction in the number of *fatal* and injury accidents. Before conversion, 25 fatal and 132 injury accidents were reported. After conversion, these accidents were reduced to only 6 and 100, or 76 per cent and 24 per cent, respectively."

Four-way stop installations where traffic volume does not warrant lead to disrespect and weaken the effectiveness of the system elsewhere. Some local authorities have attempted to use the four-way stops as a means for slowing speed without enforcement. This practice is frowned on by State authorities.

"The Case for the Four-Way STOP Sign" by H. H. Harrison, Engineer of Traffic, Illinois Division of Highways, COOK COUNTY HIGHWAYS, *130, N. Wells St., Chicago 6, Ill., November, 1954.*

Studies on liquid limit and particle-size analysis

Two articles here summarized present valuable information for engineers and soil specialists. The first aims at speedier testing methods; the second a study of the comparative effectiveness of various dispersing agents used in soil analysis.

"A Comparison of Rapid Methods for the Determination of Liquid Limits of Soils," by the Physical Research Branch Bureau of Public Roads. Reported by Frank R. Olmstead and Clement M. Johnston, Highway Physical Research Engineers.

"Engineers responsible for the routine testing of large numbers of soil samples for highway construction and maintenance need rapid methods for testing. In this study, two simplified methods of determining the liquid limit of soil are compared with the standard method to indicate reliability and accuracy. Both are 'one-run' methods, that is, they require a single determination of moisture and number of blows for groove closure to calculate the liquid limit.

"The methods discussed — the chart method developed by the Washington State Department of Highways and a modification of the chart method involving use of a slide rule — have been compared for a wide range of soils found in many of the States. Both of these methods are rapid and reduce the time normally required for testing by as much as 30 to 70 percent. They were found to have good reproductibility and to have sufficient accuracy, within limits, to be acceptable as alternate test procedures for the standard method used for the determination of the liquid limit soil constant."

"A Study of Dispersing Agents for Particle-Size Analysis of Soils," by the Physical Research Branch Bureau of Public Roads. Reported by Adolph M. Wintermyer and Earl B. Kinter, Highway Physical Research Engineers.

"In the particle-size analysis of soils, mechanical agitation and the physicochemical action of a dispersing agent are employed to disperse a soil sample in water and prepare a suspension for subsequent determination of particle size-groups by sedimentation techniques. The dispersing agent fulfills two functions vital to the accuracy of the analysis: it assists the mechanical treatment in the initial separation of naturally cemented or aggregated prime particles, and it provides conditions for normal sedimentation in the suspension during the test period by preventing flocculation (or other interfering effects) of the dispersed particles.

"Since their introduction to analytical procedures a few decades ago, many different types of chemical dispersing agents have been employed, with varying results. At present, sodium metasilicate is widely used in soil testing for engineering purposes, and sodium hexametaphosphate, sodium hydroxide, and sodium carbonate are among those used for agricultural soils. However, the reported results of numerous studies do not afford a clear evaluation of effectiveness because of the lack of consistency in methods and techniques and, frequently, the narrow scope of experimental soils and dispersants. The investigation reported here was undertaken to provide this needed evaluation.

" A large group of dispersing agents representing a wide range of chemical properties were tested with a broad selection of soils under closely controlled conditions of analysis. The resulting data showed sodium metasilicate to be relatively ineffectual in the dispersion of several soils and not suitable for general use. Several others, such as the carbonate, hydroxide, and oxalate of sodium, produced a high degree of dispersion with a few soils, but failed to stabilize the suspensions of others. Sodium polyphos and sodium tripolyphosphate were highly and about equally effective for all of the experimental soils representing many of the great soil groups of continental United States. Two others,

sodium hexametaphosphate and sodium tetraphosphate, were only slightly less so. However, none of these four phosphates was effective with laterite, a soil of the tropics. Conversely, this soil was highly dispersed by trisodium phosphate and tetrasodium pyrosphosphate, which were generally ineffective with members of the other soil groups."

From PUBLIC ROADS, *Bureau of Public Roads, Washington 25, D. C., August, 1954.*

Carbon monoxide automatic alarm

A highly effective indicator that gives rapid and effective warning of sub-lethal concentrations of carbon monoxide is described in a final engineering report of the Army's Chemical Corps. The alarm operates satisfactorily at temperatures from —40 degrees to 125 degrees F. and under both salt-air and high-humidity conditions. Both visible and audible alarms operate continuously at concentrations of 200 (plus or minus 50) p.p.m. The alarms also operate whenever oxidizable foreign agents enter the combustion chamber, thus protecting against toxics other than carbon monoxide.

"Alarm, Carbon Monoxide, Automatic, E23", Army Chemical Center, Maryland, 1954. 54 pp, with photos and tables. Available from OTS, U.S. Department of Commerce, Washington 25, D.C. Price $1.00.

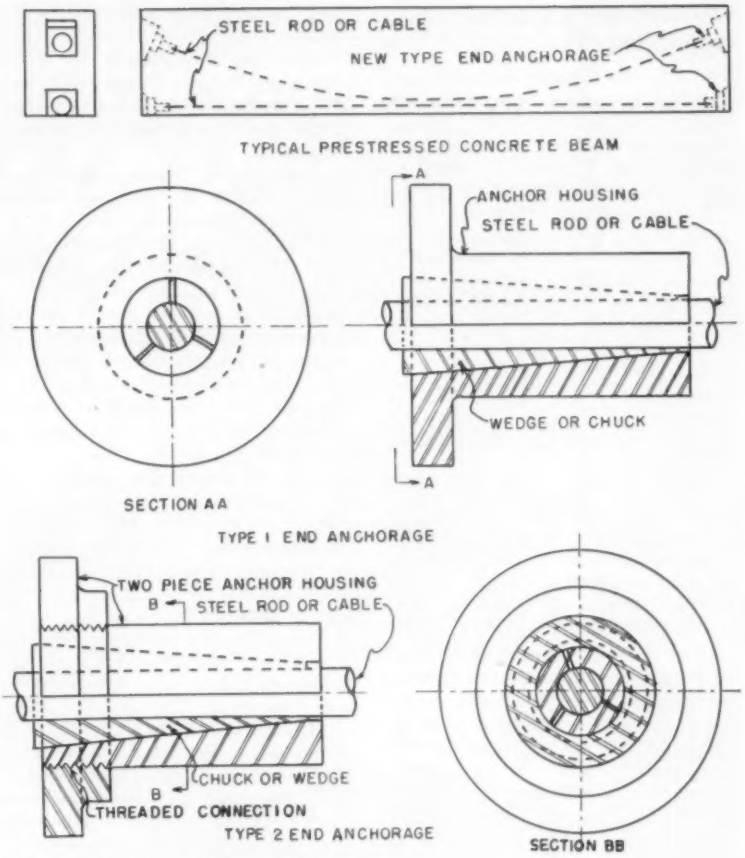
An anchor for pre-stress steel in concrete

Design details shown herewith pretty thoroughly describe a new type of pre-stress steel anchorage developed for the State Highway Department by the Texas Engineering Experiment Station.

Completely sunk in the body of the beam, and permitting a flush cutoff of projecting steel, the device makes possible the placing of precast beams end-to-end without intervening space, and so saves extra width in caps and abutments. It also eliminates the need for ordering steel to exact lengths, and the difficulties of field fitting.

It is equally usable with rods or cables, and is said to be cheaper, as well as more convenient, than conventional types of anchors.

As shown in the drawings, the grip of anchor on steel is produced by three chucks or wedges, driven home after the necessary stress has been developed by the tensioning jacks.



● Detail of Pre-stress Anchor Design.

Anchor barrel must be heavy enough to resist the bursting action of the wedges, and the flange must be broad enough for proper bearing on the concrete. Square flanges, or other shapes, are practical.

"Normally cement grout will be pumped into the space surrounding the steel, throughout the length of the beam, after the rods have been properly anchored."

Credit for the development goes to research engineer, Henson K. Stephenson, and Truman R. Jones, Jr., assistant research engineer of the Station.

"Researchers Develop New End Anchor for Prestressed Concrete", TEXAS ENGINEERING EXPERIMENT STATION NEWS, *College Station, Texas, September, 1954.*

"Methods of Reasoning" for engineers and others

The following quotation from an announcement by the publisher indicates the scope and character of this little volume.

"This booklet is the practical application of the tools of the scientific method to the everyday problems of industry and engineering. It is the first practical approach to be written specifically so that the layman as well as the technical person can quickly grasp the principles and apply them to their daily difficulties. For the engineer, it gives a new slant and a refreshing review of some vital principles he may have forgotten.

"The scope in which this work falls is basic to our way of life because it deals with the means of securing agreement, reaching decisions, assuring cooperation, and even more important, meeting problems head on with confidence of reaching a sound conclusion.

"The material contained in this booklet for years has been the foundation for courses and discussion groups at the Society. Now it is compiled in printed form for the first time."

"Methods of Reasoning" by F. D. Scott, available from the Publications Office, Cleveland Engineering Society, 2136 E. 19th St., Cleveland 15, Ohio. Published September, 1954, Price $1.00.

Prestressed concrete requirements

Criteria for design, materials, and construction were revised and greatly enlarged from the "guide," *Design Criteria for Prestressed Concrete Bridges (Post Tensioning)*, issued by the Bureau of Public Roads in March, 1952. Recognized authorities in this country and abroad participated in the revisions, which is intended to serve as a standard until the code of practice now in preparation by a joint committee of the American Society of Civil Engineers and the American Concrete Institute is completed. The current publication, in pamphlet size, includes eight pages of criteria, fifteen of discussion, and three of references.

Criteria are grouped under 29 heads, examples being: Temporary stresses, Ultimate strength, Decrease in prestress due to friction, Prestressing reinforcement, Testing, Pretensioning method, Post-tensioning method, Unbonded steel.

Discussions are directed in general to the same subjects as the criteria. Opinions of different authorities are noted and questions or conflicts cited. Following is an example from the section on friction between wire, cable, or bar and the enclosing duct, under the heading, "Post-tensioning method."

"The allowance for friction when making the design is especially emphasized by Muller (33), Hajnal-Konyi (28), and Dobell (22). Both Leonhardt (31) and Dobell (22) believe that, if the stress-strain curve is used instead of a general value for the modulus of elasticity, the computations based thereon should check the field measurements within 5 percent. It should be noted, however, that a small tension must be placed on the pretensioning elements prior to measuring the elongation in order to take up the slack. Garrett (26) suggests that 400 p.s.i. tension is sufficient for this purpose."

"Criteria for Prestressed Concrete Bridges," U. S. Department of Commerce, Bureau of Public Roads, 1954. Obtainable from Superintendent of Documents, Government Printing Office, Washington 25, D. C. Price 15 cents.

Dynamic testing of soils

Intent of the symposium here listed is to present all practical available information in the field of soil dynamics and to consider some of the most urgent remaining problems. Sponsor for the compilation was the Committee on Soils for Engineering Purposes of the American Society for Testing Materials.

After an introduction by R. K. Bernhard, Rutgers University (Chairman of the Symposium Committee) the 12 papers and their authors are as follows:

"The Elastic Theory of Soil Dynamics," Patrick M. Quinlan, National University of Ireland, Cork, Ireland.

"Vibrations in Semi-Infinite Solids Due to Periodic Surface Loading," Tse Yung Sung, Harvard University.

"A Discontinuous Model for the Problems of Soil Dynamis," J. J. Slade, Jr., Rutgers University.

"Vibration Research on Road Constructions," C. Van der Poel, Koninklijke/Shell-Laboratorium, Amsterdam, The Netherlands.

"The Pressures Generated in Soil by Compaction Equipment," A. C. Whiffin, Road Research Laboratory, Harmondsworth, Middlesex, England.

"Dynamic Analogy for Foundation-Soil Systems," Adrian Pauw, University of Missouri.

"Elasticity and Damping Effects of Oscillating Bodies on Soil," H. Lorenz, Technical University, Berlin-Charlottenburg, Germany.

"Compaction of Sand at Resonant Frequency," Frederick J. Converse, California Institute of Technology.

"Loose Sands — Their Compaction by Vibroflotation," Elio D'Appolonia, Carnegie Institute of Technology.

"Performance Records of Engine Foundations," Gregory P. Tschebotarioff, Princeton University.

"Pilot Studies on Soil Dynamics," R. K. Bernhard, Rutgers University, and J. Finelli, Stevens Institute of Technology.

"Macromeritic Liquids," Hans F. Winterkorn, Princeton University.

In addition to the papers in the symposium, a bibliography of publications is included, with references listed to 197 books and papers.

"Symposium on Dynamic Testing of Soils," 266 pages, heavy paper cover, American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. 1954. Price $3.50 per copy.

Cost of new floors on 3 old bridges

The jobs reported are for the replacement of worn out floors with metal "bridge plank" and asphalt surface.

The Quilcene River bridge in Jefferson County, Washington, is 18 ft. wide by 80 ft. long. Stringers were treated lumber on 2-ft. centers. Each metal plank was fastened to every stringer with 3 — ½"x4" lag screws, with washers, two lag screws at the outside of the lap and one in the center of the plank. This is the breakdown of costs:

		per sq. ft.
1,440 sq. ft. 12-gage bridge plank		$1.09
900 ½ in. by 4 in lag screws and washer		0.064
	at $ 93.41	
Placing plank only		
4 men 12 hrs. at $2.21 per hr.	$106.08	
1 foreman 12 hrs. at $3.00 per hr.	36.00	
	$142.08	0.098
Cost of stringers and placing of same is not included.		
The labor figure is very liberal and includes:		
(1) Time spent getting organized.		
(2) 1½ hours travel time for each man or a total of 7½ hours travel time.		
(3) Removing temporary plank deck.		
(4) Allowing traffic to pass over bridge every 15 minutes.		
Asphalt paving in place at approx. $12.00 per ton (average 3 in. deep)		0.21
	Total	$1.462

The Caesar Creek bridge in Greene County Ohio, is 16 ft. wide by 118 ft. long, built in 1910. Cost figures below represent a complete reflooring, using metal bridge planks, which was done in 5 days:

Materials:		
Bridge plank (10-gage)	$2,284.48	
Welding rod	24.75	
Asphalt mixture (including approaches)	408.00	
Labor:		
Crane unloading plank	$ 7.00	
Air compressor	36.00	
Acetylene torch	40.00	
Welder (42 hrs.)	97.02	
Welder's helper (13 hrs.)	20.80	
Unskilled labor	96.00	
	$ 296.82	
Total	$3,014.05	
This much of job cost (per sq. ft.)	$	1.59
The balance of project consisted of replacing worn beams and painting at cost of	$ 832.11	
The grand total of the job cost was	$3,846.16	

The "Narrows" bridge in Hennepin County, Minnesota, built in 1911, is 24 ft. wide between railings and 360 ft. long. All parts of the bridge were structurally sound except the floor system.

The installation was completed and the bridge reopened in 24 days. Work included removing old floor, refastening and painting existing steel stringers, resetting bearing plates, and installing new floor, wheel-guards and sidewalk. Contract price was $24,850.00, with costs broken down this way:

Supply and install 7-gage steel plates	$1.99
Asphaltic concrete surfacing (not including seal coat)	0.27¼
Total	2.26¼ per sq. ft.

"New Floors Replace Old," by H. L. White, Armco Drainage and Metal Products, Inc., RURAL ROADS, *22 West Maple St., Chicago 10, Ill., September-October, 1954.*

Road and Street Maintenance Made Easy with the GALION 303 MOTOR GRADER

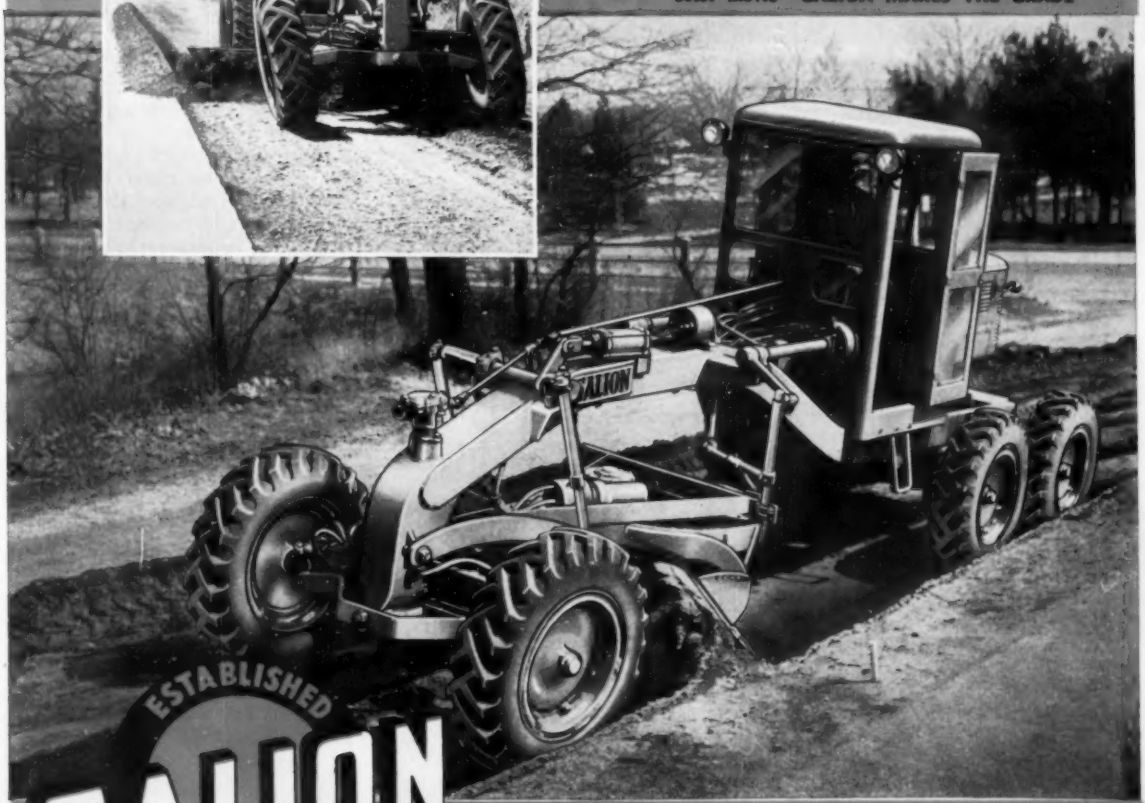
COMBINES ECONOMY WITH VERSATILITY

The Galion 303 Motor Grader gives top performance on maintenance jobs such as ditching, bank cutting, berm shaping, scarifying, mix-in-place surfacing, etc. Also widely used on medium-duty construction work. And it does these jobs at the lowest possible cost in investment and operation.

Dependable 55 h.p. diesel engine, positive four-wheel all-gear drive, smooth hydraulic control, easy handling, and overall ruggedness are outstanding features of the GALION 303.

Write for literature.

Ask your Galion Dealer to show you the color movie "GALION MAKES THE GRADE"



ESTABLISHED GALION 1907

MOTOR GRADERS · ROLLERS

THE GALION IRON WORKS & MFG. CO., General and Export Offices, Galion, Ohio, U.S.A.

Cable address: GALIONIRON, Galion, Ohio

. . . for more details circle 189, page 16

Buried Columns and Struts Hold Hillside

● An unstable hillside above the Bayshore Freeway, in San Francisco, was toe-strengthened by a unique system of pillars, sills and struts. Showing the completed job.

AN unusual retaining structure was completed recently along the Bayshore Freeway in San Francisco. Built as part of the Army Street to 17th Avenue section of the freeway late in 1953, the structure was designed to hold a high cut slope, above which was located a parallel street and a row of houses.

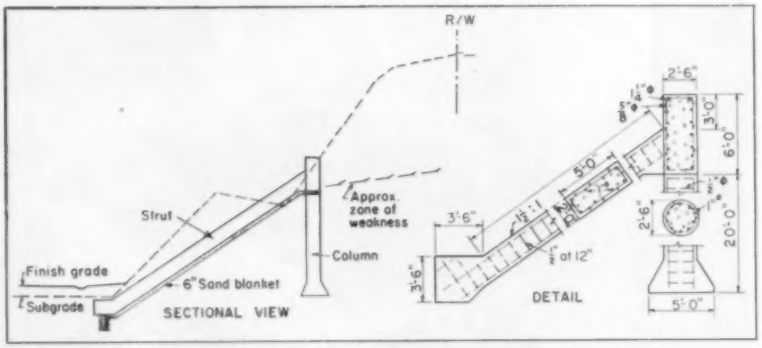
In such a situation occurring in a rural area, the solution might have been to slice down the hill until a stable slope was reached. But to do so here would have meant seriously undermining the street. Since cracking from uneven settlement had already been observed in some of the hill-top homes, the job of stabilizing the slope above the freeway became a major undertaking. The original plan was for a benched slope, but as field work progressed the need for some kind of slope reinforcement became evident.

The solution consisted of a row of 2½-ft.-diameter concrete pillars, set in the ground on a line part way up the slope, tied together at the top by a concrete sill, and braced by a series of parallel struts.

The pillars were constructed by reaming holes to a depth of about 26 ft., using a special rotary drill rig which belled the holes to 5 ft. at the bottom. Column-type reinforcing assemblies were then set and the holes filled with concrete. Columns were spaced every 12 ft., seventeen columns in all for a distance of 192 ft.

The struts, one running down the slope from each column, were specified to be of one of two designs, as ordered by the engineer in the field to meet soil conditions. One design has a cross-section 5 ft. 0 in. wide by 2 ft. 0 in. deep, with a toe of equal width; the other, a section 2 ft. 6 ins. by 2 ft. 6 in. with a flared toe. The sills in either instance were built in trench with their tops flush with the fine-graded slope. A 6-in. sand blanket was specified under each sill. The toes of the struts were tied across by a bottom sill. Extensive installation of Hydrauger drainage units was made during the construction, to tap all possible ground water.

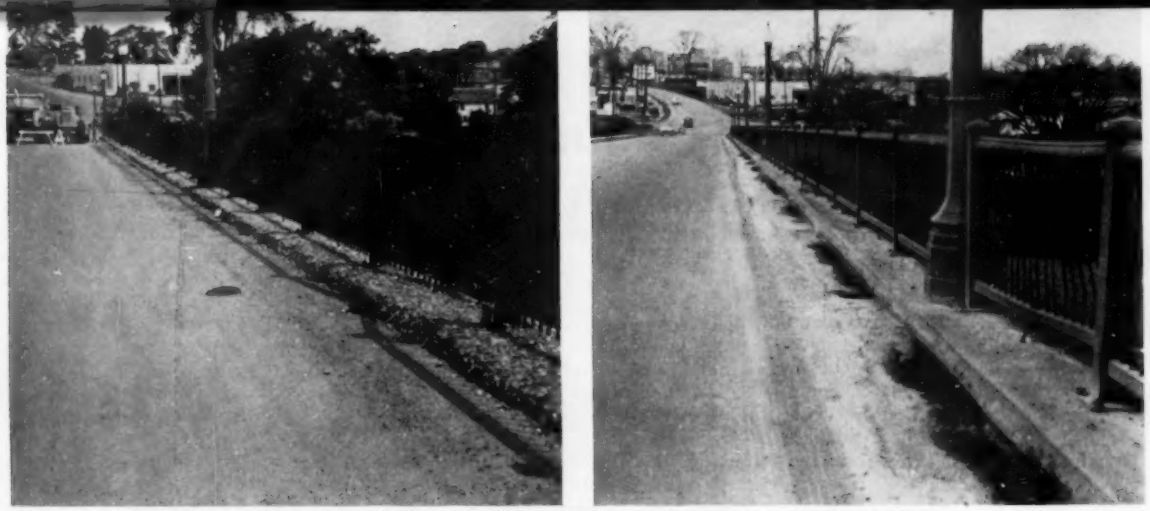
As a final step, the area between the upper and lower sill was surfaced with a layer of stone rip-rap, covering the struts and leaving only the sills exposed. This scheme of toe reinforcement has been in service for over a year and has been entirely successful. The work was part of a contract held by Frederickson & Watson, of Oakland, California, under the California Division of Highways, San Francisco.



● Cross-section and structural details of pillar, sill, and strut unit.

● One of several Hydrauger drainage outlets which tap groundwater in the slope.

● There was a 2.4 death rate per 100 million vehicle miles on the New York Thruway in 1954, the Thruway Authorities report. This compares with the national average of 7 and a state average of 6.1. Also with the figure of 7.5 for the Pennsylvania turnpike, and 4.1 for the New Jersey turnpike for 1953.



● "Before" and "after" gun repair job on badly deteriorated curbing of the Thompson Road Bridge in Syracuse.

Syracuse Cuts Concrete Repair Costs with Gunning Unit

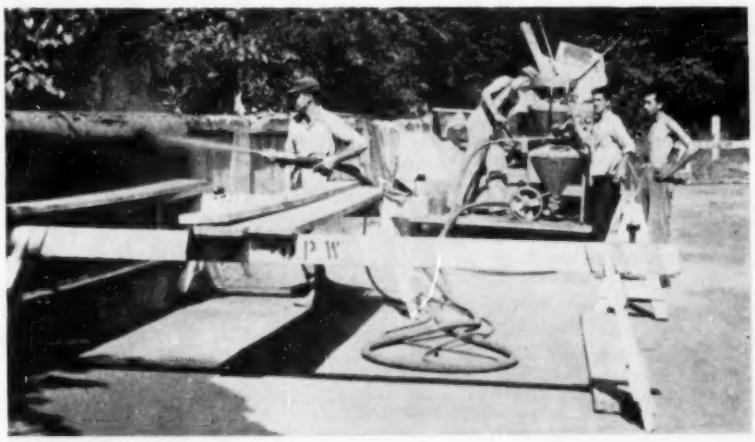
A COMBINATION of concrete gunning equipment and a portable rig has proved a fast, efficient answer to concrete maintenance problems for the department of public works in Syracuse, N.Y.

The gunning equipment (Bondactor) shoots cementitious aggregates by compressed air. Pre-mixed aggregate is placed in the upper hopper and fed continuously under pressure from the lower hopper into the material hose. It is then propelled to a gun nozzle which has separate air and water lines. At the nozzle, the aggregate is thoroughly coated by the atomized spray, and the mixture is instantly shot on the surface. A low water ratio assures a dense, concrete and durable bond.

The city of Syracuse maintenance personnel report that gunning with this equipment cuts down on restoration work because it does a permanent job. The dense surface bonds to the base masonry and forms a durable water and acid resisting build-up which contributes to both tensile and compressive strength of the masonry.

Curb repairs are cited by John Silky, superintendent of maintenance operations as an example of how the Bondactor and portable rig combination has produced savings in time, labor and materials and has also done a better repair job over old methods. The gunning equipment is mounted on the rear of a tractor-powered unit. Storage hoppers for materials and an air compressor fit on the same platform. The unit is easily and rapidly moved along a length of deteriorated curbing as the gunned concrete is applied.

The practicality and speed of this set-up, Silky says, has been proved on dozens of repair jobs in addition to curbing maintenance. Their rig has been used to repair retaining walls, steps, bridge abutments, creek banks, and other concrete structures.



● Showing portable rig used in Syracuse on some 30 major concrete repair jobs.

● Typical restoration of old concrete railing by concrete gunning method.

● This Syracuse street bridge was saved from complete destruction and restored to like-new condition by the concrete gun.

"Impossible" County Road Rebuilt

23 per cent grades; hairpin turns on mountain road made headaches for maintenance crews until mechanical solution was found.

A FEW miles south of Woodland Hills, California, where the steep sides of mountains rise up out of Topanga Canyon, maintenance crews of the Los Angeles County Road Department have finished rebuilding what the workers believe was the most impossible section of highway in the county road system. For more than a year the 3,200 ft. section had maintenance supervisors and men alike "buffaloed." Some men said flatly that it could never be rebuilt. Others said it might, but they didn't know how.

The section was built several years ago principally as an aid to fire fighting in Topanga Canyon. In addition, it served a few residents who live on the steep mountainsides. The road has numerous hairpin turns involving radii as low as 100 ft. Its sharpest grades are 23 per cent.

To meet all-weather standards or better, the County some years ago built the section 18 ft. wide, with asphalt penetration treatment of one gallon per square yard of SC1 asphalt. That served for a while, until traffic during the past two years broke up the asphalt in many places and developed potholes. A first-class rehabilitation job was needed.

Los Angeles County highway engineers felt sure roadmix was the answer, if it could be done in such a place. The County owns a large one-pass type roadmixing machine, but its use was out of the question. It couldn't even travel the section, let alone get around the sharp corners. Further penetration work was out of the question because asphalt distributors could not work on the steep grade. Some thought of motor grader operations, but that method, too, was judged impractical. The most workable scheme anybody had developed was a roadmix job with the aid of an old-fashioned pull grader and an International TD9 tractor. That would have taken weeks.

It was at that trying time that someone remembered the County's Palmdale yard, where a new Seaman self-propelled Trav-L-Plant was waiting for summer work to begin. The machine had been purchased with the thought of rehabilitating old asphalt pavements, and of premixing bituminous mixes in strategic areas for summer road work. As far as anyone knew the machine had never worked on such grades or curves but it was worth a chance.

The machine moved in one morning at 8 a.m. The 3,200-ft. section is divided almost evenly in two 1,600-ft. halves up one side of the mountain, and down the side of Topanga Canyon. The numerous grades and sharp switchbacks are typical of both sections. The travel plant climbed one half of the mountain under its own power, and with extra heavy tines in place began to rip up the old asphalt cake as it came down the other side. With the exception of a few abnormally tough spots where the scarifier teeth on an Allis-Chalmers motor grader were used to help out, all pulverization of the old asphalt cake was successfully done by the Seaman machine. By late that afternoon the machine had ripped up and pulverized all the old asphalt, and in addition had dug and blended the upper three inches of the old roadbed.

The rehabilitation scheme proposed consisted of mixed-in-place application of 1.5 gal. per sq. yd. of SC2 asphalt, placed at 225 to 250 degrees. The travel plant was equipped with an automatic asphalt metering device, as well as an indicator for forward speed. There was every indication — despite the grades and curves — that the SC asphalt could be injected under actual mixing conditions through the machine. By putting in the asphalt in this manner, there would be no tendency for the bitumen to flow downhill.

By Friday evening at quitting time, only sixteen work hours, after starting the job, all the oil was in. It had been successfully placed, even around the curves on the steepest grades by using a small truck-mounted 1,000-gal. pressure distributor hooked directly to the Seaman machine. In general the oil injection had been done at forward speed of from 70 to 75 ft. per min., or somewhat slower than the normal 120 to 150 fpm rate for flat road surfaces.

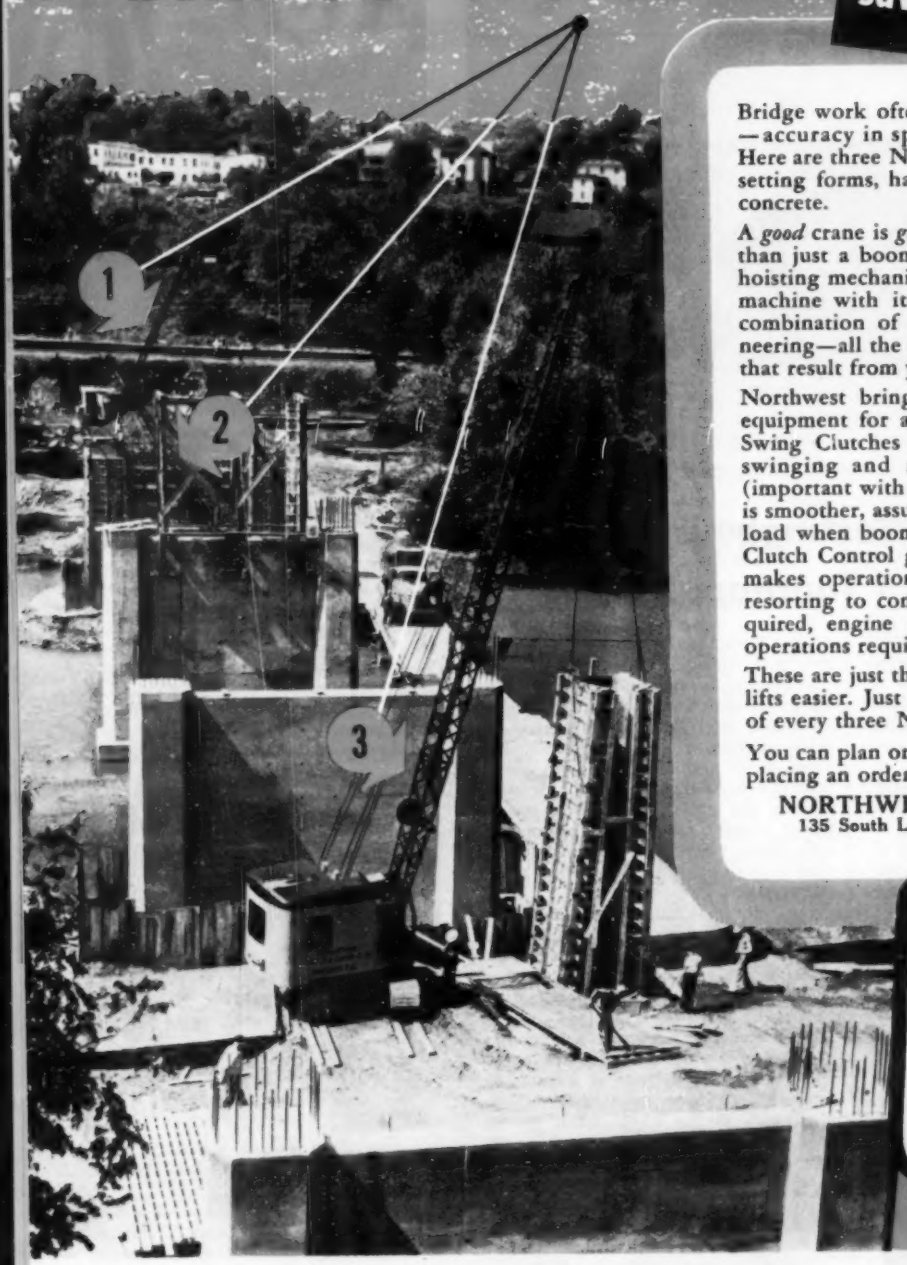
The machine then worked eight hours Monday and three hours Tuesday to finish developing a blend of asphalt and granular soil in the highway subbase. This blend was accomplished satisfactorily after three passes. The machine even worked uphill part of the time on this operation. After the blending job was done the mix was compacted by a 3-wheel Huber steel roller.

In less than 3½ shifts the pulverizing, mixing and rolling job had been successfully completed. Only six maintenance men had been used, along with two trucks, an asphalt distributor and a motor grader, part time, in addition to the steel wheel roller. For less than $2,500 the section which everyone thought impossible had been successfully rebuilt with a 3½ in. roadmix asphalt wearing surface.

● Sharp switchbacks made it impossible to re-work the County road with conventional equipment.

CRANE VERSATILITY for BRIDGE WORK

Smoothness and ease of control save time and money



Bridge work often calls for niceties in operation — accuracy in spotting, flexibility in booming. Here are three Northwests on a typical bridge job setting forms, handling reinforcing and pouring concrete.

A *good* crane is *good* on every crane job! It's more than just a boom — or a feature — a clutch or a hoisting mechanism. It's a combination of a basic machine with its multiplicity of advantages — a combination of design, materials, balance, engineering—all the tangible and intangible qualities that result from years of experience.

Northwest brings you a choice of boom hoist equipment for any condition. Uniform Pressure Swing Clutches take the jerks and grabs out of swinging and makes spotting the load easy (important with high booms). Northwest steering is smoother, assures easier manuevering with the load when booming high. The "Feather-Touch" Clutch Control gives the "feel of the load" and makes operation smoother and easier without resorting to complicated mechanisms. When required, engine throttle control is available for operations requiring variable speed.

These are just the high spots for making the high lifts easier. Just a few of the reasons why one out of every three Northwests sold is a repeat order.

You can plan on a Northwest! Why not talk over placing an order. Get the full story.

NORTHWEST ENGINEERING CO.
135 South LaSalle Street, Chicago 3, Illinois

Perhaps Rubber Tired Equipment will do your job better. The Northwest Truck Crane brings you a combination of advantages found in no other similar machine. Get the full story before you buy.

NORTHWEST

CRAWLER and TRUCK MOUNTED SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

. . . for more details circle 214, page 16

What's New
in Equipment and Materials

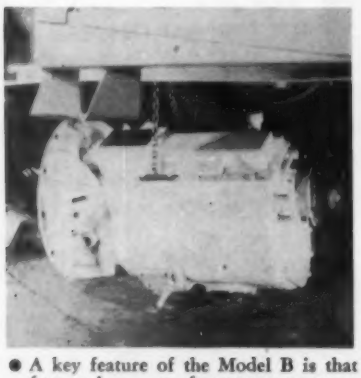
(See Page 16 for Reader Service Coupon and more items)

● LeTourneau-Westinghouse's new 23-yd. Model B Tournapull.

LeTourneau-Westinghouse's New 23-Yard Tournapull

A new 23-yd. Tournapull, the Model B, has been introduced by LeTourneau-Westinghouse Co., of Peoria, Ill. It is announced as the first new machine completely designed and built since this new company was formed. Design emphasis has been especially placed on high mechanical performance for heavy earthmoving and expeditious maintenance of key power components.

The Model B has a struck capacity of 18 yd. and a heaped capacity of 23 yd. without sideboards. It is 11 ft.-8 in. wide, 12 ft.-7 in. high, and has an overall length of 40 ft.-6 in. Despite its size, the non-stop, turn-around area is reported to be only 35 ft. Weight distribution also has received special attention. The Model B is so designed that 56 percent of the loaded scraper weight is on the two drive wheels.



● A key feature of the Model B is that fast replacement of component assemblies is possible. Here, the transmission is shown being removed without pulling the engine.

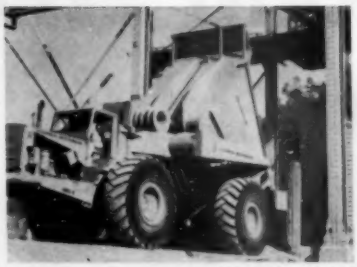
All power is supplied by a single 293-hp diesel engine, which can be either a Cummins or General Motors unit. A wide selection of working speeds is provided by 10 gear ratios, enabling speeds from 2.4 to 28.4 mph. As an exclusive feature, the power train has a special power transfer differential. It automatically keeps power flow equal and constant to both drive wheels, thereby minimizing wheel spin on soft soils.

For required traction, all tires are 27 x 33, 30-ply, with both tires and wheels interchangeable between the prime mover and scraper units. Scraper wheels are mounted inside the cutting edge width of the scraper blade.

Field and shop maintenance work has been simplified by providing for easier removal and replacement of key power components. Major component assemblies, such as the transmission, clutch, final drive, and differential, can be removed and replaced without handling or displacing other components. For example, the transmission can be removed without pulling the engine and the transfer case by unloosening only a few bolts.

Operating equipment also features electric controls, power steering, 4-wheel air brakes, and a large-size fuel tank. Total brake surface is 7,536 sq. in. The fuel tank is of sufficient capacity to give a 10-hour supply of fuel or full-shift operation without refueling.

Other characteristics of the Model B are a 6 ft.-6-in. apron lift, deflector plate at rear of the bowl, and a heavy push-block. The pushblock is mounted low and is connected to the scraper bottom as well as the side sheets.



● The 35-ton rear dump which can be used with the Model B prime unit.

A 35-ton rear dump is being manufactured for use with the Model B prime unit and is interchangeable with the scraper unit. It is made of heavy steel plate, reinforced with box beam ribs. Rated capacity is 23 yd. struck and 27 yd. heaped without sideboards. The bowl is 17 ft.-8 in. long, 19 ft.-2 in. wide, and has a maximum depth of 7 ft.-6 in.

For more information circle 105 on Service Coupon Page 16 and mail now.

Special Panels for Concrete Manholes

Special panels designed to be grouped in an octagonal shape and used in pouring concrete manholes have been built by the Symons Clamp & Manufacturing Co., 4249 Diversey Ave., Chicago, Ill., for the Union Electric Co. of St. Louis. They consist of a magnesium frame, with a panel of plastic face plywood. The panels have no tie openings, but are cross braced for strength and are held together by connecting bolts and wedges.

Special Panels for Pouring Concrete Manholes

For more information circle 106 on Service Coupon Page 16 and mail now.

Clamshell Bucket Has Dual Rams

A new ¾ yard clamshell bucket, which uses two hydraulically operated rams instead of a single center ram to handle bowl action, has been developed by Bucyrus-Erie Co., South Milwaukee, Wisc. for use with its truck-mounted, all-hydraulic H-3 Hydrocrane. The new bucket has been designed to step up the versatile Hydrocrane's digging output in any kind of going. Lower ends of the rams are attached directly to the upper edge of the bowl sections. Since the dual rams — one for each bowl — never extend into the bucket, there is no load

interference. Use of twin rams, coupled with improved leverage, are claimed to provide 42% more force to the lips at the point of closing than earlier bucket.

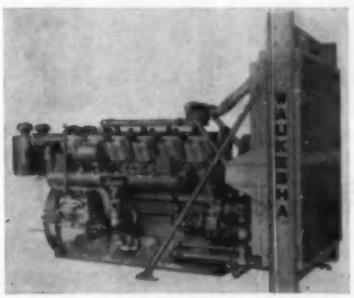
Bucket deck area and internal size have been increased. Struck measure capacity is 10.4 cu. ft. The bowl sections are curved to provide maximum penetration and quick loading with minimum heeling.

Dual Ram Clamshell Bucket

For more information circle 107 on Service Coupon Page 16 and mail now.

Power Unit

A new Model VLR series 12-cylinder power unit, available for use with propane-butane or natural gas fuel, and as a full diesel with normal aspiration or turbo-supercharged, has been announced by Waukesha Motor Co., Waukesha, Wis. This new V-12 Waukesha is a high compression, overhead valve, sixty-degree vee, 4-cycle engine, with 8¼ in. bore and stroke. Operating on butane-propane, it develops approximately 870 HP with radiator, fan, and air cleaners. Unit ratings of the normal diesel and the turbo-charged diesel are approximately 800 and 1100 HP respectively. Bare engine ratings are higher. Maximum speed is 1200 rpm.



New Waukesha Engine Engineered for Greater Load and Stand-Up Performance

For more information circle 108 on Service Coupon Page 16 and mail now.

Eimco Tractor Available for Bulldozer & Other Attachments

The Eimco Corporation, 636 South 4th West St., Salt Lake City, Utah, has announced that its 105 tractor is now available for bulldozer, winch or other attachments. The Eimco 105 tractor was announced about a year ago with a loading attachment. Both loading and bulldozing attachments are Eimco products, but the basic tractor is built to standard

Eimco 105 Tractor with Bulldozer

SAE mounting dimensions so that any attachment made with standard SAE drilling will fit the prime mover.

The tractor is claimed to feature a group of "firsts" in design and construction that are only on the Eimco machine. These features include: unidrive transmission which provides for gear shifting under full power in motion and instant reversals, while eliminating the need for steering with the clutches; and clutches that never need adjustment, with complete elimination of the master clutch. Independent track control through dual final drives is provided so that one track may run forward while the other runs in reverse for true spin turns.

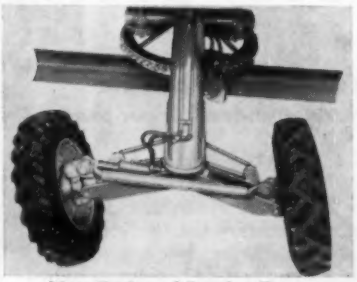
For more information circle 109 on Service Coupon Page 16 and mail now.

Leaning Front Wheel Design Revised for A-C Grader

Allis-Chalmers Manufacturing Co., Tractor Division, Milwaukee 1, Wisc., has announced design changes in its front wheel assembly for the Model D motor grader. The changes provide greater service and performance from the Model D and add further strength.

Design revisions have reduced the number of wear points on the leaning front wheel assembly and on the grader's steering mechanism. Shim adjustments are used to take up knuckle wear and bushings have been replaced by tapered and roller bearings. The greater weight of the new front axle adds to the overall weight of the Model D.

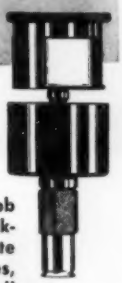
Improved control over the leaning operations have resulted from reducing the travel speed of the leaning front wheels, and adding further strength to the tie rods. As in the past, the front wheel lean assembly is optional equipment for the standard Model D motor grader.



New Design of Leaning Front Wheel Assembly

For more information circle 110 on Service Coupon Page 16 and mail now.

OPTICAL SQUARES
THE
"WATCH POCKET"
TRANSITS



WILD Optical Squares, tiny surveying instruments containing pentagonal prisms, will do the complete job of laying out and checking buildings, concrete forms, ditches, pole lines, boundaries, etc., as well as cross sections and topo maps.

These handy tools actually fit your watch-pocket. They require no field adjustment and little or no practice for use.

Single Pentagonal Prisms $19.00
Double Pentagonal Prisms $26.25
Plumbing Rod (Optional) $26.25
(Plus Postage)

For Detailed Information Regarding the "Why and How" of Optical Squares Request Booklet R53

Full Factory Service by Specialists

WILD HEERBRUGG INSTRUMENTS INC.
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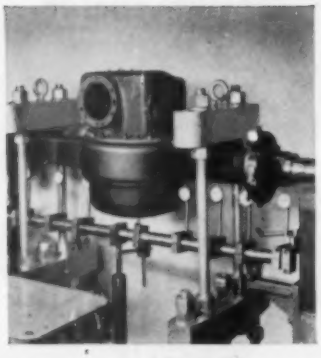


This is the "Torture Chamber"... Here TDA proves axle quality!

An axle is picked out of stock—then subjected to such tests as a simulated "chuckhole" shock every 4 seconds, 24 hours a day for months! Or a "bend test" on an axle housing for 1,000,000 cycles. Or an axle shaft "twist test" of 14° backwards and forwards 36 times a minute, 24 hours a day, days on end. We even simulate 500,000 miles of the toughest driving situations in just a few days—or invent a test like driving uphill with a full load from California to New York nonstop! *There's no other testing like it!*

WE HIT 648,000

in the famous, one-and-only indoor proving ground!

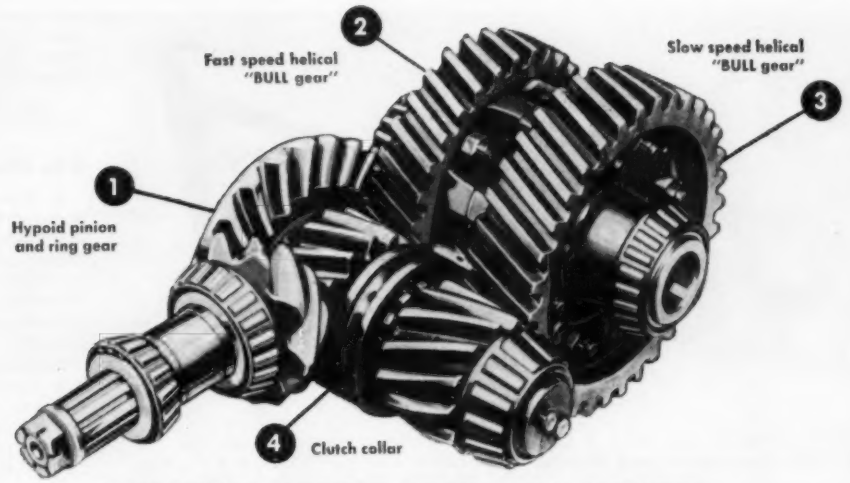
We give axles a merciless beating! Equal the worst possible operating conditions. Then throw in some devilish tests of our own!

It's without equal! Nowhere else does such murderous torture show you *in advance*, how an axle is built to stand it on the job!

We've condensed a multi-thousand acre proving ground into one room in the Timken-Detroit "Torture Chamber." Here, our engineers can put over 50 years of experience to work for you—unsurpassed experience, obtained in building axles for all types of trucks, buses, trailers, farm machinery. Here, we can give stock axles and gearing "the works" *indoors*, to any *outdoor* operating condition—under scientific control and analysis.

How do you benefit? In longer axle life, less maintenance, repairs and downtime; lower operating costs. That's why Timken-Detroit axles are the choice of leading manufacturers and operators.

Meet our "Torture Tester"! With graphs showing speed and torque performance under any operating conditions he chooses—with special dials, recorders and electronic devices—he actually *drives* axles with scientific accuracy from his chair!



EXCLUSIVE DOUBLE-REDUCTION DESIGN...
gives TDA 2-speed axles far greater gear ratio "spread"!

Unequalled Flexibility! Only Timken-Detroit 2-Speed Axles are available in *three* different ratio "spreads" to meet any transmission-engine combination: 28%, 37% or 49%. Unlike ordinary designs that are limited to 37%, this Timken-Detroit Axle selection may be obtained simply by changing the low speed helical gear set.

How TDA 2-Speed Principle Works: A husky hypoid ring gear and bigger, stronger pinion set (No. 1 above) provides the *first step* of the total gear reduction for both fast and slow ratios. Two large, heavy-duty helical gear sets provide the *second step*. Both sets are of balanced size and capacity. One set (No. 2) is for fast speed—the other (No. 3) is for slow speed. The clutch collar (No. 4) moves to left or right to engage one helical pinion or the other. The helical pinion not in use idles.

The Result: Complete elimination of small, complicated parts and midget-size gears! Larger hypoid-helical design gives more teeth in contact—reducing load per unit of contact area—for more positive, quiet operation. Bearings are larger. There's longer engine and truck life. When you divide the total gear reduction, you double its life expectancy. TDA gears operate in either ratio *indefinitely* without overheating.

"CHUCKHOLES" A MONTH

Timken-Detroit Axle

TIMKEN Detroit AXLES
TIMKEN-DETROIT AXLE DIVISION
ROCKWELL SPRING AND AXLE COMPANY
DETROIT 32, MICHIGAN
The Accepted D A Co Standard
TRADE MARK REGISTERED

"TORTURE-TESTED"
to Save Money on the Job

World's Largest Manufacturers of Axles for Trucks, Buses and Trailers

Plants at: Detroit, Michigan • Oshkosh, Wisconsin • Utica, New York • Ashtabula, Kenton and Newark, Ohio New Castle, Pennsylvania

. . . for more details circle 228, page 16

New TDA brake shoes save up to 40 lbs. per axle

• Lightweight, pressed steel construction to give you more payload plus long wear and safety. Exclusive ¾" TDA "Econoliner" brake liners held rigidly by 12 deep set rivets per block —*not bolts*. Liners are thickest at center where greatest wear occurs—taper down at ends. Result—longer wear, greater stopping ability. New cam roller mountings never seize or brinell. Light nylon camshaft bearings wear up to 4 times as long!

3/8-cu. yd. Unit Challenger Model 510

Full-Floating Drums on 3/8 Cu. Yd. Unit Truck-Mounted Shovel

The Unit Crane and Shovel Corp., 6411 W. Burnham St., Milwaukee 14, Wis., announces the addition of a new ⅜-cu yd. line of equipment. Completely new in design and construction, this model features hydraulic clutch control and full floating, trunnion mounted tapered drums. Self-aligning hook shoes distribute applied pressure over a maximum bearing area. Other special features include force-feed lubrication, interchangeability of parts, and full-range vision safety cab with large side entrance powered by a Ford heavy-duty industrial engine with torque converter.

Also incorporated in the new Unit Challenger are those standard features proven to contribute substantially to the life, performance and efficiency of all Unit equipment, such as one-piece cast gear case, straight-in-line engine mounting, involute splines and drop forged parts.

For more information circle 111 on Service Coupon Page 16 and mail now.

New Tractor Shovel Offers Greater Productivity

A new, more powerful 2 yd. model HD-9G tractor shovel, with design modification improvements, claimed to offer greater productivity, longer life, maintenance simplicity, ease of operation and maximum visibility, has been announced by Allis-Chalmers Mfg. Co., Tractor Division, Milwaukee 1, Wisc. The new HD-9G produces 100 net engine hp and 82 drawbar hp simultaneously handles maximum traction and hydraulic pump power requirements with complete ease. With a low gear speed of 1.4 mph, the HD-9G develops 23,000 lb. pull at the drawbar or push at the shovel. The improved HD-9G also incorporates a new ceramic master clutch lining originally developed for aircraft wheel brakes. This new type clutch lining is stated to operate longer between adjustments, reduces lever pull for easier operation and offers increased clutch life even on the toughest jobs.

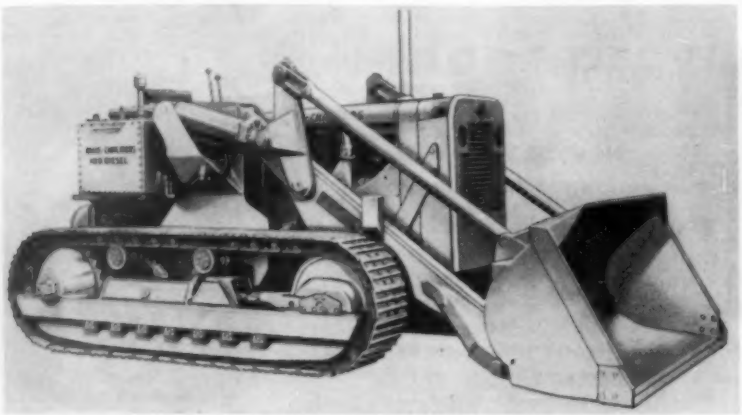
A completely new bucket design for the 2 yd HD-9G is stated to facilitate digging, loading, and dumping easier, faster and cleaner — reduces spillage. A deeper box section and replaceable wear plates of tough, abrasive steel give added strength, longer bucket life.

For more information circle 112 on Service Coupon Page 16 and mail now.

Hydraulic Drive for Mower

A new independent hydraulic system to drive mower sickles on J. I. Case "VAIH" tractors is another special hydraulic application using hydraulic components, designed and manufactured by Wisconsin Hydraulics, Inc., 3165 North 30 Street, Milwaukee 16, Wisc. The hydraulic system consists of a gear type pump driven from the front of the engine crankshaft, a 4-way valve and a reversible hydraulic motor.

For more information circle 113 on Service Coupon Page 16 and mail now.

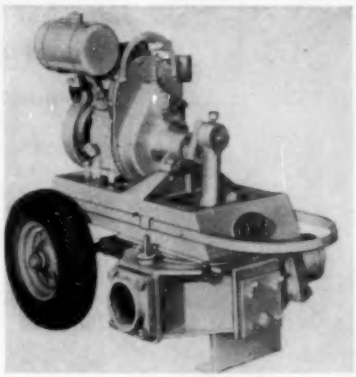


New 2 Yd. HD-9G Tractor Shovel

4 in. Closed Diaphragm Pump

A new Rex 4 in. closed diaphragm pump, put into production by Construction Machinery Division, Chain Belt Co., Milwaukee 1, Wis., is designed for application where the fluid to be pumped cannot be effectively handled with a centrifugal pump because of a high solids content.

Improvements include straight line flow, a new Rex feature, that helps to keep intake and discharge valves flushed and free of debris at all times. Power has been increased with a Wisconsin AKN 6.2 hp engine.



4-in. Closed Diaphragm Pump

For more information circle 114 on Service Coupon Page 16 and mail now.

New Type of Wire Rope

Developments in wire manufacture and rope fabrication now permit Roebling to announce a new line of wire rope, with steel cores, having 15% greater strength than the strongest grade marketed heretofore.

In the past, one of the obstacles to rope of higher strength was a proportionate decrease in other qualities as the strength went up. The new rope has higher resistance to wear from bending and abrasion. Laboratory tests as well as on-the-job observations, over several years, have proved these facts. Consequently, the new rope not only has higher strength, but will also deliver longer rope life. The new rope will be manufactured primarily in performed constructions.

The higher strength rope will be obtainable in rope sizes ranging from ¼ in. to 3½ in. Industries that will benefit will be those which use a wire rope with independent wire rope core. The new ropes are for use on shovels, draglines, wagon-scrapers and the entire gamut of earth-moving equipment. For more information, write to A. Neroni, Adv., Mgr., John A. Roebling's Sons Corp., Trenton 2, N.J.

For more information circle 115 on Service Coupon Page 16 and mail now.

THE NEW UNIVERSAL 293Q TWINDUAL PACEMAKER

combines peak production with maximum portability

TOP CAPACITY PRODUCTION

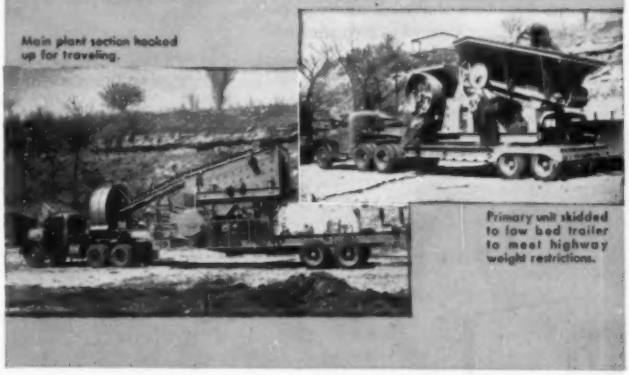
The TwinDual Pacemaker gives you three full stages of reduction for top capacity—a Universal overhead eccentric jaw crusher in the first stage and a TwinDual roll crusher for the second and third stages.

No other single unit plant offers so many big-profit advantages. Big primary jaw crusher accepts large rock—lets you work gravel pits containing big boulders. Exclusive TwinDual two-stage roll crusher gives top capacity secondary crushing. Its high ratio of reduction permits the primary jaw to operate at 50 to 100% wider discharge opening. This results in greater capacity—less jaw wear. Larger inclined gyrating screens with full screening area allow 20 to 25% greater output. All operations from apron feeder to delivery conveyor are driven through one single power unit.

For top capacity with three stages of reduction—and a bonus in longer crusher life, lower horsepower requirements and a better quality finished product, choose a Pacemaker. Available in five models for pit or quarry operation. Get complete profit making facts now.

LOW TRAVELING WEIGHT

The primary jaw crusher, apron feeder with grizzly by-pass, operator's platform and structural supports are all mounted as a single unit on skids. This primary unit is bolted to the main truck frame. When highway weight limitations must be met, this unit may be quickly skidded to a low bed trailer and transported separately.



Main plant section hooked up for traveling.

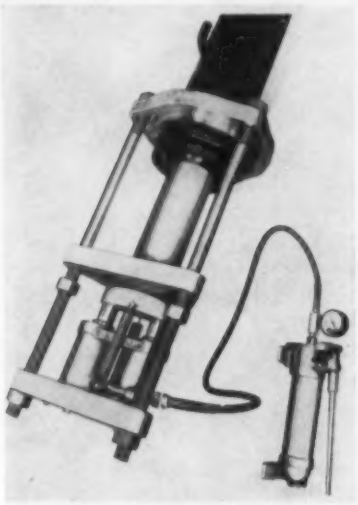
Primary unit skidded to low bed trailer to meet highway weight restrictions.

PETTIBONE UNIVERSAL
In Cedar Rapids Since 1906

UNIVERSAL ENGINEERING CORPORATION
631 C Avenue N. W., Cedar Rapids, Iowa
Subsidiary of Pettibone Mulliken Corporation, 4700 W. Division Street, Chicago 51, Illinois

. . . for more details circle 234, page 16

Track and Accumulator Spring Set



Track and Accumulator Spring Compression Set

Utilizing their portable 50 ton Power-Twin, center hole hydraulic ram for power, OTC has designed and built a special tool set for removing and installing the track and accumulator springs on the Td-24 International tractor. It gives the 35 tons of power required to compress the heavy track spring.

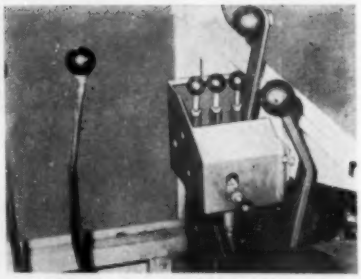
This set may be ordered without the hydraulic units for the convenience of those who already have an OTC 50 ton unit with a sprocket puller, forcing press, track master pin remover or other-OTC hydraulic equipment.

For complete details write to Owatonna Tool Co., 435 No. Cedar St., Owatonna, Minn.

For more information circle 116 on Service Coupon Page 16 and mail now.

Lorain Reduces Operating Effort 70%

Machines in the ½ and ¾ yd. classes, built by The Thew Shovel Co., Lorain, O., are now equipped with "E-Z" action controls which it is claimed reduce the effort on the operating levers by 70%, thus affording extremely easy operation and exceptionally fast response.



Hydraulic Power Crawler Controls

Operating levers have been streamlined and slenderized in appearance and move on roller bearings. The operating levers actuate the clutches through a simpler linkage in which the number of parts has been reduced and easier, faster response achieved through the use of 19 anti-friction bearings.

Concurrently with the improvement in the operating controls, the hoist and drag shoe type clutches have been redesigned to include the following: an improved dead end linkage that eliminates all ad-

Clark to expand new Michigan equipment plant

Clark Equipment Company will expand its new "Michigan" construction equipment plant at Benton Harbor by 40 per cent, George Spatta, president, told a group of construction magazine editors recently at an engineering seminar. The affair was in observance of the opening of the recently completed 150,000 sq. ft. facility devoted exclusively to the manufacture of construction equipment.

Contract for the 60,000 sq. ft. expansion has been awarded to The Austin Company, engineers and builders of the first unit. The expansion will include machine shop facilities, additional raw material storage and a section that will allow consolidation of engineering and administrative personnel at one location.

Mr. Spatta spoke at a dinner meeting that climaxed an all-day seminar on trends in design and engineering of off-the-road equipment. Engineering specialists from Clark's Automotive and Construction Machinery Divisions presented papers on such subjects as "Automotive Engineering for Construction Equipment," "Frame Design for Construction Equipment," "Axle Design for Construction Equipment," "Transmission Design for Construction Equipment" and "Control Systems for Construction Equipment."

● Assembly line viewed from the third station, looking towards starting end.

● Recently completed but already slated for expansion, new Benton Harbor plant of Clark Equipment Company.

justment at the dead end of the shoe; new spring-loaded live end which not only reduces operating effort but also reduces adjustment frequency because the shoe automatically follows the clutch drum to maintain the proper adjustment.

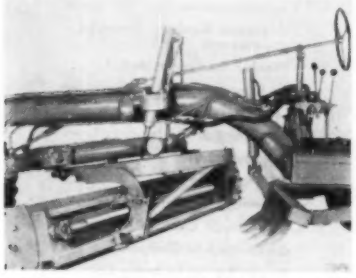
Crawler machines in Thew-Lorain's ½ and ¾ yd. classes, in addition to the above "E-Z" levers are equipped with hydraulic power controls to cover the following crawler operations: engagement and release of the turntable swing lock to hold the turntable against side motion during travel; release of the tread locking pawls; shifting of jaw clutches for selection of swing or travel; steering the crawler in either direction.

For more information circle 117 on Service Coupon Page 16 and mail now.

Hydraulic Moldboard For A-C Grader

A hydraulic shiftable moldboard has been introduced by the Tractor Division of the Allis-Chalmers Manufacturing Co., Milwaukee 1, Wisc., as an additional accessory for its Model D motor grader. The powershift moldboard, similar in design to the hydraulic moldboard of the AD-40 motor grader, permits a side shift of 16 in. right or left — a total of 32 in. The blade can be shifted from the operator's seat.

The shiftable moldboard is stated to be very desirable when working around guard rails, mail boxes, culverts, buildings, finishing between forms and other similar operations. When used in conjunction with the TLD shoulder maintainer, the power shift moldboard is stated to speed shoulder maintenance as it permits work around the various obstructions generally encountered on shoulders.



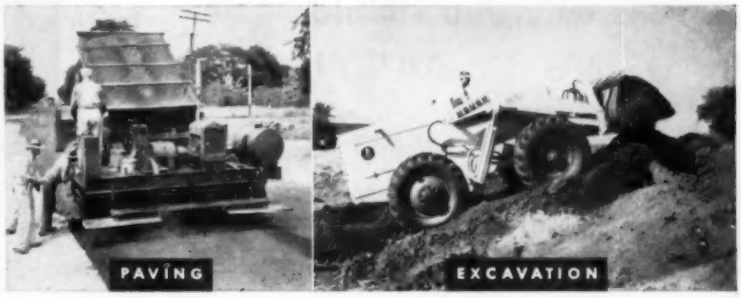
Hydraulic Shiftable Moldboard on Allis-Chalmers Model D Motor Grader

For more information circle 118 on Service Coupon Page 16 and mail now.

Portable Rig for Air Placement of Concrete

A new portable rig for the air placement of concrete has been announced by the Air Placement Equipment Co., 1011 W. 24th St., Kansas City, Mo. The new rig consists of the Airplaco Bondactor for the gunning of concrete and other cementitious materials and the Airplaco mix elevator, a combination proportioning, mixing and elevating machine. The two pieces of equipment are used in a combination to form the combination Bondactor-Mix Elvator portable rig.

Dependable Power by HERCULES



for All Construction Needs!

Whether it's gasoline, gas or diesel powered construction equipment, dependable Hercules power is your assurance of low cost operation and a minimum of "down-time". 70 models ranging from 3 to 500 H.P. provide the right size engine for all construction needs.

If you are buying new equipment or repowering old machinery, it will pay to investigate the advantages of Hercules power. There's a "right-size" Hercules engine or power unit for your particular application. The above photographs illustrate a few of the various applications of Hercules Engines in construction machinery.

For more complete information on Hercules Engines and Power Units write the factory or contact your local Hercules distributor. Ask for Bulletin SP-136, it gives horsepower ratings, weights and dimensions on Hercules Engines and Power Units.

Engine Specialists since 1915

HERCULES ENGINES

HERCULES MOTORS CORPORATION

107 Eleventh Street, S. E. • Canton, Ohio

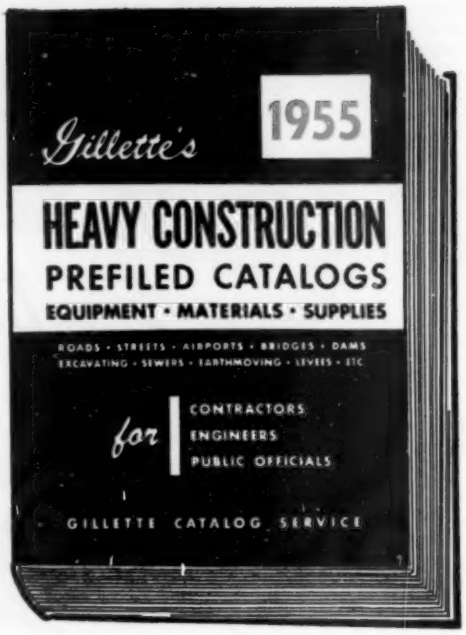
... for more details circle 196, page 16

here . . . without a doubt . . . is the most useful buying catalog in your office

. . . and here are some reasons why you should be USING IT DAILY!

- Catalogs are PREFILED — saving you time and space required to file individual manufacturers' catalogs.
- Saves you the time and inconvenience of writing to manufacturers for catalogs.
- Gives you all the facts needed BEFORE you make a buying decision.
- Manufacturers' names and trade names indexed alphabetically for quick reference to individual catalogs.
- All the buying information is 'boiled down' — designed for your convenience.

After checking the advantages listed above, you can see why this ONE CATALOG offers you so MANY advantages . . . saving you both time and money, not only in the mechanical and physical aspects of a cataloging operation . . . BUT MOST IMPORTANT OF ALL . . . it is available WHEN you NEED it . . . BEFORE you make your buying decisions! The manufacturers represented in this catalog are literally 'meeting' with you in your office — offering you all the information you could possibly need concerning their products. Why not meet them at least half way — and USE THEIR PREFILED INFORMATION!



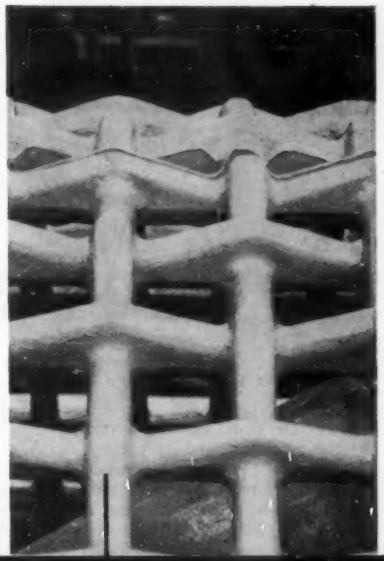
Here are the manufacturers represented in Gillette's Heavy Construction Prefiled Catalog:

Aeroil Products Company
American Steel & Wire Div.
Anthony Company
Armco Drainage & Metal Products, Inc.
Austin-Western Company
Badger Machine Company
Barber-Greene Company
Bicknell Manufacturing Co.
Blaw-Knox Company
Briscoe & Son, E. B.
Bros Boiler & Mfg. Co., Wm.
Buffalo-Springfield Roller Co.
Butler Bin Company
Carey Manufacturing Co., Philip
Chrysler Industrial & Marine Engine Corp.
Clark Equipment Company
Cleveland Trencher Company
Colorado Fuel & Iron Corp.
Concrete Surfacing Machine Co.
Continental Motors Corporation
Cummer & Son Co., F.D.
Cummins Engine Co., Inc.
Detroit Diesel Engine Div.
Dorsey Trailers
Electric Tamper & Equipment Co.
Erie Strayer Company
Flexible Road Joint Company
Flintkote Co.
Galion Iron Works & Mfg. Co.
Gar-Bro Manufacturing Co.
Gar Wood Industries, Inc.
General Motors Corp.
Gledhill Road Machinery Company
Goodall Rubber Company
H & L Tooth Company
Harnischfeger Corporation
Heil Company
Heltzel Steel Form & Iron Company
Henry Manufacturing Co., Inc.
Hogan Company
Hough Company, F. G.
Huber Manufacturing Co.
Ingersoll-Rand
Jackson Vibrators, Inc.
Joy Manufacturing Company
Keystone Asphalt Products Company
Kiesler Company, Jos. F.
La Crosse Trailer Corporation
Le Roi Company
Littleford Bros., Inc.
McKiernan-Terry Corporation
Mid-Western Industries, Inc.
Minneapolis-Moline Company
Naugatuck Chemical Div.
Owen Bucket Company
Pacific Car & Foundry Co.
Pioneer Engineering Works, Inc.
Reliance Steel Products, Inc.
Republic Steel Corporation
Rogers Brothers Corp.
St. Paul Hydraulic Hoist
Seaman Motors, Inc.
Servicised Products Corp.
Shawnee Mfg. Co., Inc.
Shunk Manufacturing Co.
Stow Manufacturing Co.
Symonds Clamp & Manufacturing Co.
Timken Roller Bearing Company
Toncan Culvert Association
United States Rubber Company
United States Steel Corp.
United Steel Fabricators, Inc.
Wellman Engineering Company
Wico Electric Company
Wisconsin Motor Corporation

"GRID® ROLLER COMPACTS MORE YARDS PER HOUR at lower cost per yard..."

...says John P. Abramson Construction Co.

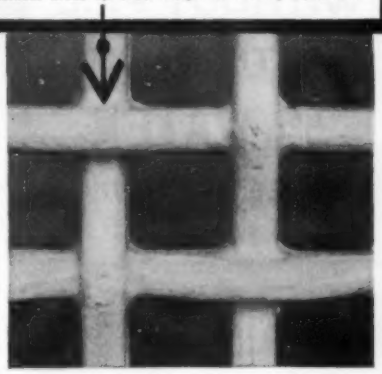
faster compaction with less fluff keeps hauling units moving at higher speeds...



This portion of the fill was compacted with a Grid Roller.

This portion of the fill was compacted with another type roller.

Note how the fill compacted with the Grid Roller remained firm while section compacted by other methods broke up under weight of hauling equipment.



This highly efficient Grid compacts fills at higher speeds with minimum penetration and displacement of material.

"The Hyster Grid Roller is a good compaction tool because it gets required density at high speeds and leaves very little fluff. This allows our hauling units to maintain high speed coming on and leaving the fill. For these reasons, and its low maintenance cost, we are able to compact more yards per hour at a lower cost per yard," said John P. Abramson, John P. Abramson Construction Co., Des Moines, Iowa.

The Abramson outfit was working on airport runway extension fills. Material was clay-silt—difficult to compact. It came out of the borrow pit with 25% to 40% moisture with an optimum moisture content of approximately 18%.

The borrow pits were ripped with a Caterpillar ripper and allowed to dry before the material was moved. Further aerating was accomplished on the fill by discing and rolling with a sheepsfoot roller. The Grid Roller working its assigned section of the fill achieved the required density (95% modified proctor under the runway and 90% on the sides) in 6 to 12 passes. The 8-inch lifts were rolled at speeds of 10 to 15 m.p.h. with the roller weighted to 30,000 lbs.

The Hyster Grid Roller can reduce your costs on compaction jobs. See your Caterpillar-Hyster Dealer, or write Hyster Company, 2995 N.E. Clackamas Street, Portland 8, Oregon, or 1895 N. Adams Street, Peoria 1, Illinois.

... for more details circle 198, page 16

HYSTER COMPANY

"Matched Design" Tractor Tools for Caterpillar-built Tractors

Bondactor-Mix Elvator Portable Rig

The mix elevator (left in photograph) mixes the aggregate and prepares it for the Bondactor. The dry materials for the aggregate are placed into the Mix Elvator through a proportioning chute in the side of the machine. There they are thoroughly and uniformly mixed by means of an auger-type mixer in the base of the machine. A bucket-type conveyor picks up the mixed concrete, elevates it and deposits it in a reservoir hopper which is directly above the Bondactor. As the aggregate is needed, it is released into the upper hopper of the Bondactor.

The Bondactor (right in photograph, mounted on the chassis of the Mix Elvator), guns or shoots the cementitious aggregate by means of compressed air. Pre-mixed aggregate placed in the Bondactor upper hopper is metered continuously under pressure from the lower hopper into the material hose. It is propelled to the patented nozzle which is equipped with separate air and water lines. At the gun nozzle, the aggregate is thoroughly hydrated by an atomized spray.

For more information circle 119 on Service Coupon Page 16 and mail now.

25 HP Concrete Saw For Heavy Duty

A new concrete saw, designed for heavy duty performance, has been announced by Eveready Briksaw Co., 1509 South Michigan Blvd., Chicago 5, Ill. Model E-25-PD is equipped with a 25 HP 4-cylinder, air cooled, gasoline engine that drives the saw under full load at speeds up to 12 ft. a minute. Two abrasive coated wheels act as a smooth, positive friction drive to both rear wheels of the saw. The simplicity of this mechanism is claimed to eliminate slippage, jerking, and bumping or twisting of the blade. Movement of the saw is smooth and constant.

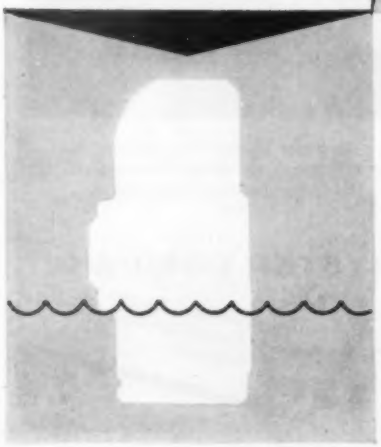
"Powr-Drive," as the self-propelling unit is called, is engaged or disengaged by foot pedals in easy reach of the operator. Cutting speed is quickly set by turning the control lever on the variable speed transmission.

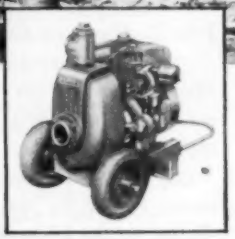
Model E-25-PD Concrete Saw

Another factor which prevents blade binding and unnecessary blade wear is the Eveready "Tri-Matic" blade alignment. The blade is held straight in the cut, without twisting, when the saw wheels are passing over uneven surfaces. Although the "Tri-Matic" suspension of the front axle has the effect of providing a 3-point suspension of the blade, the saw chassis is firmly mounted on 4 wheels with solid rubber tires. The saw naturally tends to cut straight, without drifting — especially since motive power is supplied to both rear wheels.

For more information circle 120 on Service Coupon Page 16 and mail now.

BARNES PRIMES WITHOUT FAIL WITH ONLY 1/3 WATER LEVEL IN PUMP





The patented self-priming principle in Barnes *"33,000 for 1" Pumps picks up the prime with only 1/3 normal water level in the pump—and primes extra fast. Reduces down time due to priming failure. Cuts hauling of priming water to a minimum.

BUY BARNES SELF-PRIMING CENTRIFUGAL PUMPS

See your BARNES distributor today or write for Catalog R3.

Barnes MANUFACTURING CO. MANSFIELD, OHIO

BARNES MANUFACTURING CO.

Mansfield, Ohio **Oakland 21, Calif.**

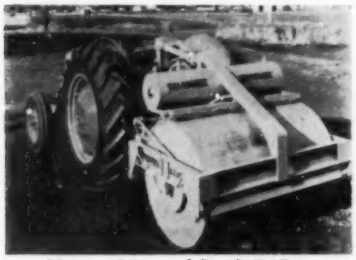
Buy the Best... Buy Barnes

... for more details circle 166, page 16

Tractor Patch Roller

A new rear-mounted roller, announced by Shawnee Manufacturing Co., 1947 North Topeka Ave., Topeka, Kan., is raised hydraulically. The down pressure is sufficient to raise the rear wheels of the tractor, thereby utilizing the combined weight of the roller and the tractor rear end for compaction. The unit is stated to produce 90 lb. of compaction per sq. in. without the addition of fluid in the roller.

When the rear wheels of the tractor are raised, and the unit is in operating position, it is driven by a reversible hydraulic motor. Transporting the patch roller is no problem, since it can be raised hydraulically by actuating a valve near the driver's seat — the tractor then can be driven at normal speeds over the streets.

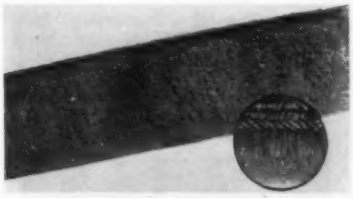


Tractor Mounted Patch Roller

For more information circle 121 on Service Coupon Page 16 and mail now.

Mat for Wetting Rollers

A new product, the Hydro-Mat, for wetting the rollers on road rollers, announced by Koffler Sales Corporation, 3757 North Racine Ave., Chicago 13, Ill., is claimed to give a brushing action while filtering an even spray, yet uses much less water than ordinary mats. The new mat distributes water evenly over the entire surface of the roller. Hydro-Mats are constructed of the finest cocoa fibers in double strength with a triple reinforced binding. They are stated to be engineered to use less water, retain moisture longer, and maintain a brush-like stiffness.



Hydro-Mat for Wetting Rollers of Road Rollers

For more information circle 122 on Service Coupon Page 16 and mail now.

7-Roller Track Frame For Tractor

A new seven-roller, oscillating-type track roller frame is now available as an attachment for the Caterpillar D8 Tractor, according to an announcement from Caterpillar Tractor Co., Peoria, Ill. Installation of this track roller frame on the D8 is stated to provide increased traction, greater flotation and better stability, particularly when the unit is operating in hilly terrain and locations where underfoot conditions are soft or unstable.

A tractor equipped with the seven-roller frame requires a 42-section track in place of the 39-section track included on the standard six-roller machine. New arrangements for bulldozers, both cable and hydraulic, and for the Cat No. 46 hydraulic control are also required for use with tractors equipped with the longer frame. Heavy-duty track roller guards are available as attachments for use with the seven-roller track frame.

For more information circle 123 on Service Coupon Page 16 and mail now.

Compact Hydraulic Steering Booster

A new compact hydraulic power steering booster, designed for wide application in mobile machinery, including trucks, buses, material handling equipment, construction and mining machinery has been announced by Vickers, Incorporated, 1400 Oakman Boulevard, Detroit 32, Mich. Compactness has been achieved in the new model as a result of a new servo control valve design and relocated hydraulic connections.

Designated as the Series S23, the booster is available either with or without relief valve, and can be either factory installed or mounted on vehicles in

PREVENTS STRIPPING

FACILITATES WET-MIXING

INSURES FAST ADSORPTION

IMPROVES AGGREGATE UTILITY

DEHYDRO®

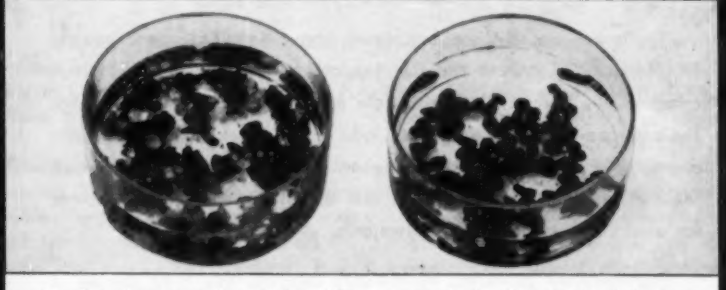
Asphalt Anti-Stripping Additive

A Tretolite Company Product

Dehydro Asphalt Anti-Stripping Additive is a liquid organic material with excellent heat stability characteristics. It facilitates the formation of a firm bond between asphalt and aggregate in the presence of moisture.

Dehydro Additive is easily handled at ordinary air temperatures. It is heat stable and has a low pour point. It is readily mixed with asphalt, either at the refinery or on the job.

Dehydro Additive is stocked at St. Louis and Los Angeles and is always available for immediate shipment. Shipment can be made in drums or by tank car.



The photo above shows how Dehydro Additive prevents stripping. Two samples of the same aggregate were coated with asphalt and allowed to cure for twenty-four hours. They were then placed in water at room temperature. In the left-hand container, where no additive was used in the asphalt, stripping took place in a few hours, while the right-hand sample in which Dehydro Additive was used, retained its coating.

For complete information, write or call

TRETOLITE COMPANY

A DIVISION OF PETROLITE CORPORATION

369 Marshall Avenue, St. Louis 19, Missouri

5515 Telegraph Road, Los Angeles 22, California

AA 5523

. . . for more details circle 230, page 16

POWERFUL • RELIABLE • ECONOMICAL

This powerful turbo-supercharged Waukesha is a twelve-cylinder, 60-degree vee, even firing, four-cycle, solid injection, overhead valve, compression ignition Diesel, of 8½-inch bore and stroke and 5788 cubic inch displacement. The connecting rod arrangement is of the side-by-side type; opposing pistons operating from a single wide-area crankpin.

The turbocharged Diesel unit shown above develops approximately 1100 hp at 1200 rpm with radiator, fan, and air cleaners. Without turbocharging, the normal Diesel complete unit maximum rating is 800 hp. The propane-butane model of this V-12 series develops 870 hp. Bare engine ratings of all models are higher. Response to throttle and load requirements is quick and smooth, with a fast surge of reserve power for emergency and overload demands.

Tremendously powerful, remarkably rugged, this V-12 engine is designed for simplicity and reliability. Major parts are interchangeable between right and left cylinder banks. Main and rod bearings are easily accessible. Strength, precision and balance are built into all elements of the power train, from pistons to flywheel. Supporting members are designed for extreme rigidity and perfect alignment of moving parts.

Send for illustrated Bulletins 1663 (turbocharged)—1664 (normal Diesel)—1656 (gas).

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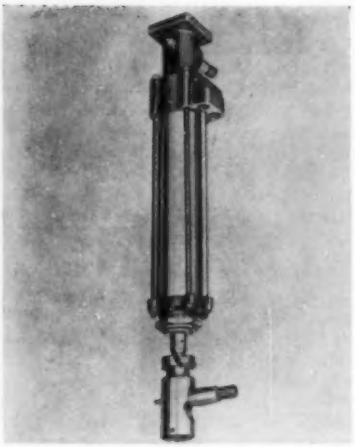
WAUKESHA MOTOR COMPANY, WAUKESHA, WIS.
New York • Tulsa • Los Angeles

. . . for more details circle 235, page 16



Series S23 Steering Booster

service. The S23 can be mounted interchangeably with the Vickers S6-270 series steering boosters, yet has a longer stroke. Installation of the new booster is made easier because of reduced diameter, in addition to mounting adaptability provided by a symmetrical control ball stud housing that can be assembled in any one of four positions.

For more information circle 124 on Service Coupon Page 16 and mail now.

Guard Rail Mounts Without Brackets

A new "Deep Beam" highway guard rail claimed to provide maximum protection against damage to vehicles and serious injury to occupant is now being manufactured by Tuthill Spring Co., 760 West Polk St., Chicago 7, Ill. Mounted directly to each guard post with a single bolt, the new rail requires no brackets, end tension anchor rods or "dead men," an important saving in cost of erection. This simplified installation is made possible by the deep convex design, which provides adequate strength and transmits the shock of impact direct to the post. Vehicles cannot "pocket" behind a post, but are automatically deflected back to the pavement at a minimum angle. Overlapping construction in the direction of travel allows the car to slide without obstruction. Tuthill's "Deep Beam" design, with its double curved surfaces to reflect light rays, also provides visibility, even in rain or fog, for safer night driving.

New Tuthill "Deep Beam" Guard Rail

For more information circle 125 on Service Coupon Page 16 and mail now.

Truck Mounted Boom Type Lift

A moderately priced truck front end hydraulic boom type lift has been introduced by Root Spring Scraper Co., 517 W. North St., Kalamazoo, Mich. Of cantilever construction, the most hydraulic lift is capable of lifting 1500 lb. Lifted load can be swung in a 40 degree arc by hydraulic power. All operations are controlled from cab and operator has full view of work at all times. The hitch or boom supporting frame can readily be mounted on any truck from 1½ tons up. The same frame is designed to support a hydraulically controlled Root snow plow, greatly increasing the utility of trucks. Readily installed hydraulic power unit and controls are available for trucks not already equipped.

Root Hydraulic Boom Lift for Truck Front End Mounting

For more information circle 126 on Service Coupon Page 16 and mail now.

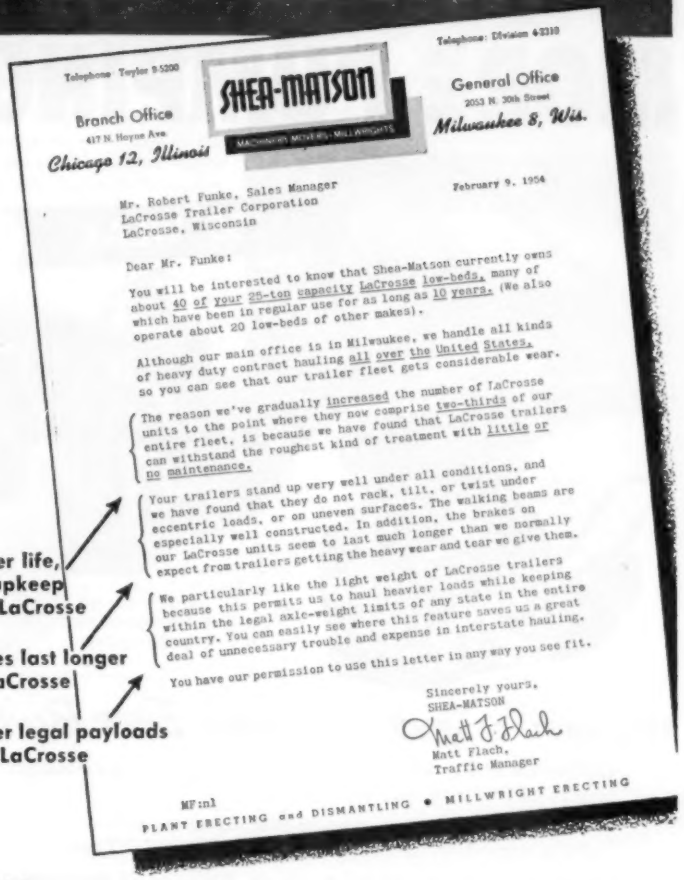
Light Weight Generator for Contractors

A new light weight generator, announced by Master Vibrator Co., 262 Stanley Ave., Dayton, Ohio, can be carried by one man, yet puts out 1500 watts of electricity. A 4-cycle, direct drive, 3 HP gasoline engine runs the generator. Available DC (97 lb.) or AC (107 lb.).

Master Vibrators New Light Weight Generator

For more information circle 127 on Service Coupon Page 16 and mail now.

10-YEAR REPORT on trailers...



Telephone Taylor 9-5200

Branch Office
417 N. Hoyne Ave.
Chicago 12, Illinois

SHEA-MATSON
MACHINERY MOVERS - MILLWRIGHTS

Telephone: Division 4-2310

General Office
2053 N. 30th Street
Milwaukee 8, Wis.

Mr. Robert Funke, Sales Manager
LaCrosse Trailer Corporation
LaCrosse, Wisconsin

February 9, 1954

Dear Mr. Funke:

You will be interested to know that Shea-Matson currently owns about 40 of your 25-ton capacity LaCrosse low-beds, many of which have been in regular use for as long as 10 years. (We also operate about 20 low-beds of other makes).

Although our main office is in Milwaukee, we handle all kinds of heavy duty contract hauling all over the United States, so you can see that our trailer fleet gets considerable wear.

The reason we've gradually increased the number of LaCrosse units to the point where they now comprise two-thirds of our entire fleet, is because we have found that LaCrosse trailers can withstand the roughest kind of treatment with little or no maintenance.

Your trailers stand up very well under all conditions, and we have found that they do not rack, tilt, or twist under eccentric loads, or on uneven surfaces. The walking beams are especially well constructed. In addition, the brakes on our LaCrosse units seem to last much longer than we normally expect from trailers getting the heavy wear and tear we give them.

We particularly like the light weight of LaCrosse trailers because this permits us to haul heavier loads while keeping within the legal axle-weight limits of any state in the entire country. You can easily see where this feature saves us a great deal of unnecessary trouble and expense in interstate hauling.

You have our permission to use this letter in any way you see fit.

Sincerely yours,
SHEA-MATSON
Matt Flach
Matt Flach,
Traffic Manager

MF:nl

PLANT ERECTING and DISMANTLING • MILLWRIGHT ERECTING

Longer life, less upkeep with LaCrosse

Brakes last longer on LaCrosse

Bigger legal payloads with LaCrosse

When leading contract haulers, whose living depends on their trailers, prefer ONE particular low-bed 2 to 1, there must be good reasons.

Take Shea-Matson Inc., for example. During the past 10 years, this nationwide operator has experimented with *all* types and makes of trailers. In addition, they've kept accurate payload and maintenance records on each one. So, when you learn that Shea-Matson Inc. has already converted 40 out of 60 of their low-beds to LaCrosse, it's a pretty good indication that LaCrosse is the *best buy for you, too.*

Thanks to larger volume, production, LaCrosse trailers often cost up to 38% less than other low-beds. You also save up to 2000 lbs. of useless dead-weight, which enables you to haul an extra ton of legal payload. But the real reason why experienced haulers prefer LaCrosse trailers is because they're built better to last longer. Bigger, safer brakes! Stronger, longer lasting main frame and deck! Stronger axles and wheels! Write today for free descriptive literature on job-proved LaCrosse low-beds — 6 to 75-ton capacity — with flat, drop or tilting platforms. LaCrosse Trailer Corp., LaCrosse, Wis. LC-34

LaCROSSE

America's Favorite **LOW-BED TRAILER**

. . . for more details circle 205, page 16

400% MORE PUMPING!

and LESS SHOCK

LESS WEAR

LESS STRAIN

ENGINE DRIVEN
DIAPHRAGM PUMP
Model 3D-8 R 6

MOTOR DRIVEN
DIAPHRAGM PUMP
Model 3D-E 1½

THE BEST DIAPHRAGM PUMP *Ever Built!*

GORMAN-RUPP Firsts —— among all other diaphragm pumps of like size and type.

- Diaphragm drive rod spring-cushioned on down stroke. Runs smoothly. Increases diaphragm life **10 Times.**
- More Pumping — by as much as 400% at 25 feet static lift.
- Suction Accumulator provides continuous smooth flow of water.
- One man handling — engine driven pump only 130 pounds job-to-job. Motor driven 165 pounds.
- Easy hook-and-tighten fittings with hose connected.

See this pump at work on the job, through your Gorman-Rupp distributor. It is absolutely guaranteed to outperform and outlast any 3 in. single diaphragm pump comparably powered now on the market.

Ask for information bulletin 4-DR-11

NOTES FROM THE FIELD - -

Bridging Kokosing River on U. S. Route 36 at Mount Vernon, O. Model 3D-E1½ diaphragm pump and model 3362-B contractors' pump, both electric powered, and model 3205 contractors' pump engine powered – On The Job.

THE GORMAN-RUPP COMPANY
MANSFIELD, OHIO

. . . for more details circle 194, page 16

Manufacturers' Literature

Handling Clay the Profit Way

"Handling Clay The Profit Way," a new booklet (Form No. D480) published by Caterpillar Tractor Co., Peoria, Ill., relates in the owner's and operator's own words how dependable, rugged equipment has saved time and money on all kinds of applications. More profit is the theme of this brochure illustrated with action photographs of all types of earthmoving equipment operating on jobs.

For more information circle 128 on Service Coupon Page 16 and mail now.

18 Heavy-Duty Power Units Described

Eighteen heavy-duty power units are described in a new catalog published by the International Harvester Co. The 18 engines have a range of from 16.5 to 200 net horsepower. They fall into three groups: four-cylinder carbureted units, six-cylinder carbureted units, and diesel units, both four and six cylinder.

The catalog lists six heavy-duty diesel power units, from 55 to 190 HP. Among other features, these engines have an exclusive gasoline conversion system for all-weather starting, precision fuel injection system with reserve torque control for extra lugging ability and four-cycle valve-in-head full diesel engine.

There is a choice of seven six-cylinder heavy duty carbureted units, from the model U-220 with 62 HP up to the big model U-1091 with 200 HP.

The five four-cylinder carbureted engines range from 16.5 to 55 HP.

Full specifications for application of the units to new installations or as replacements for existing power are available in this catalog.

For more information circle 129 on Service Coupon Page 16 and mail now.

Lubricating Oils

The development of more efficient lubricating oils to get many years reliable service from diesel engines is related in a new booklet "Let Your Diesel Live" published by Caterpillar Tractor Co., Peoria, Ill. This booklet contains the story of lubricating oils and how these oils affect the present owner or prospective purchaser of a Caterpillar engine.

For more information circle 130 on Service Coupon Page 16 and mail now.

B-E 15-B Transit Crane

A new 12-page bulletin (16-B-TC-1) describing the Bucyrus-Erie 15-B transit crane (15 ton rated capacity), is available from Bucyrus-Erie Co., South Milwaukee, Wis. Illustrated by job application photos and closeups of mechanical features, the booklet includes a list of specifications and working ranges, plus brief, easy-to-read description of the machine's major advantages.

For more information circle 131 on Service Coupon Page 16 and mail now.

Diesel-Powered Crawler Tractors

Inside and out features of the Allis-Chalmers HD-9 diesel-powered crawler tractor are shown in a 3-page cut-away view which highlights illustrative material in a new catalog now available from the Tractor Division, Allis-Chalmers Manufacturing Co., Milwaukee 1, Wisc. The catalog's 30 pages also contain many other illustrations which help tell the engineering, mechanical and operating story of the HD-9. A group of on-the-job photos tie the tractor's versatility and performance ability to the operator's job requirements. Allied equipment and special accessories matched to the HD-9 for maximum operating efficiency by the unit, are also pictured.

For more information circle 132 on Service Coupon Page 16 and mail now.

A-C Tractor with Henry Backhoe

Features of the Allis-Chalmers Model WD-45 wheel tractor equipped with Henry backhoe and other Henry hydraulically operated attachments, are outlined in the new 2-color 8-page catalog (MS-982) now available from the Tractor Division of the Allis-Chalmers Manufacturing Co., Milwaukee 1, Wisc.

In addition to specifications, the catalog includes illustrations of the basic unit and of the various Henry front and rear-mounted attachments; a cut-away view of the tractor's powerline; pictures of the 45 hp "Power-Crater" engine's replaceable "wet" cylinder sleeve, the pressure oil filter, and the exhaust valve roter. There is also an illustration of the "Power-Shift" rear wheels.

The WD-45 with Henry backhoe and other attachments is the latest addition to the company's line of excavating and materials handling equipment.

For more information circle 133 on Service Coupon Page 16 and mail now.

Bodies and Hydraulic Hoists

Galion Allsteel Model 12N-4 bodies and Model 740, 770 and 800 hydraulic hoists are described in a 4-page catalog (L-9828) published by The Galion Allsteel Body Co., Galion, O. Action photos, cutaway views and line drawings illustrate the new 2-color catalog. Construction features, mechanical details and exclusive design advantages of Galion Allsteel products are described. Complete specifications covering this series of bodies and hydraulic hoists are included. Model 12N-4 bodies are offered in lengths of 9 or 10 ft. Matching hoists are rated from 11 to 14 tons capacity.

For more information circle 134 on Service Coupon Page 16 and mail now.

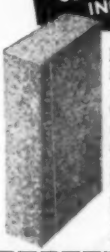
Trenching Equipment

The entire line of Cleveland trenching equipment including 2 new models introduced during 1954 is fully described in a 4-page, 2-color bulletin published by The Cleveland Trencher Co. 20100 St. Clair Ave., Cleveland 17, O. The two new machines are the Model 240 trencher and the Model 80W backfiller. Material in the bulletin is arranged to facilitate a quick comparison of the

Servicised Products
for BRIDGE and GRADE SEPARATION PROJECTS

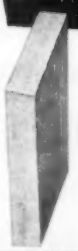
Concrete bridge and grade separation structures are subject to unusual amounts of movement due to temperature change, traffic stresses, and settling simply because they have to be built "up in the air." The following are a few of the Servicised Products which you can specify or use which will take this movement and yet keep your job sealed against moisture and attractive in appearance.

CORK and SELF-EXPANDING CORK JOINT FILLERS



Both types are non-extruding resilient and compressible, inconspicuous in color. Cork recovers 95% original thickness after compression; Self-Expanding Cork is treated to expand 50% beyond original thickness to keep joint filled regardless of contraction movement.

SPONGE RUBBER "CEMENTONE" JOINT FILLER



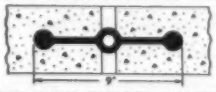
Fully resilient high quality blown sponge rubber "Cementone" blends with color of concrete. Uniform thickness and density. Available in varying degrees of compressibility to meet your requirements.

MOLDED PARA-PLASTIC

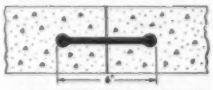
For sealing keyed construction or contraction joints in vertical walls. Maintains bond with concrete at temperatures down to sub-zero. Simple installation insures a resilient, moisture-tight seal of the joint.

PARA-LATERAL STRIP

For sealing back-filled vertical construction or expansion joints in retaining walls, abutments, wing walls, foundations, tunnels, etc. against seepage to exposed side. Para-Plastic facing of strip insures permanent adhesion to concrete.



HOLLOW BULB RUBBER WATERSTOP
For permanent, watertight seals in expansion joints where a high degree of expansion and contraction is expected.



FLAT DUMBBELL TYPE
Flexible, elastic rubber with very high tensile strength for sealing construction joints.

SPLIT DUMBELL TYPE
Faster to install . . . eliminates split forms (1) Nail to bulkhead in form of a "T" (2) Section is poured and bulkhead stripped. (3) Divided section is joined together by stapling or with rubber cement.

ASPHALT PLANK
Servicised Mineral Surfaced or Standard Plank is resilient, quiet, long-wearing. Widely used on bridges, underpasses and grade separations as a wearing surface or as a waterproofing protection course.

Write for details on these Servicised Products and your copy of the complete catalog.

SERVICISED PRODUCTS CORPORATION
6051 WEST 65th STREET • CHICAGO 38, ILLINOIS

. . . for more details circle 222, page 16

Sealing Compounds at Work!

sealing paving joints on

OHIO'S "MILLION-DOLLAR-A-MILE" TURNPIKE

with cold applied

PRESSTITE No. 77

All longitudinal and transverse joints in completed sections of the Ohio Turnpike have been sealed with Presstite No. 77. Selection of this cold applied rubber base sealer was based on successful experience of Ohio's Department of Highways, which has used No. 77 in large volume since 1951 with outstanding results.

Experience has proved that No. 77 remains flexible, resilient and adhesive longer, and forms an impervious barrier against passage of water through joints into the sub-grade better than any other type of joint sealer. It remains tough and elastic from sub-zero temperatures up to 140°.

Cold applied No. 77 is pumped direct from shipping drums into the joints under pressure through hose and nozzle, eliminating dangerous, time-consuming heating and equipment cleaning, cutting time and labor costs.

Solve your pavement sealing problems like many other states, cities and airports have done . . . Seal Right with Presstite!

FREE! *20-page catalog describing better sealing methods with cold applied Presstite No. 77.*

PRESSTITE SEALING COMPOUNDS

PRESSTITE ENGINEERING COMPANY

3782 Chouteau Avenue • St. Louis 10, Mo.

. . . for more details circle 219, page 16

capacities, specifications and dimensions of all Cleveland models. Twenty-four action photos featured illustrate various job applications on which Clevelands have been successfully employed. Brief text points out special advantages inherent in Cleveland design and construction features.

The bulletin also features Cleveland's backfilling machines, the Models 80 and 80W backfillers and the Model 190 pipeline backfiller. Brief specifications of Cleveland trailers for general equipment and materials hauling are included.

For more information circle 135 on Service Coupon Page 16 and mail now.

Catalog of Soil Testing Equipment

One of the most complete catalogs of its kind, and one of the most useful references to laboratory and to men in soils work, is the 1955 catalog second edition of Soiltest, Inc., 4522 W. North Ave., Chicago 39, Ill.

This 104 page catalog covers a complete line of physical testing apparatus for engineering tests of soils, concrete and bituminous materials covering thirty or more subject classifications. Write to Soiltest, Inc. for free copy of catalog and price list.

For more information circle 136 on Service Coupon Page 16 and mail now.

Clutch Plates, Facings, Transmission Discs, Brake Linings

Two complete, new 1955 catalogs, covering the latest additions to the standard line of genuine Velvetouch all-metal clutch plates, facings, automatic transmission discs, and brake linings, have been announced by The S. K. Wellman Co. One catalog (No. 55-T) covers the company's full selection of replacement friction parts for tractors and industrial equipment, while the other (No. 55-A) lists the firm's replacement friction parts for trucks, busses, and passenger cars. Both catalogs contain essential dimensional figures, model and year information, and parts data, and are cross-indexed for easy reference. Send request for copies, on company letter head, to Sales Department, The S. K. Wellman Co., 200 Egbert Road, Bedford, O.

For more information circle 137 on Service Coupon Page 16 and mail now.

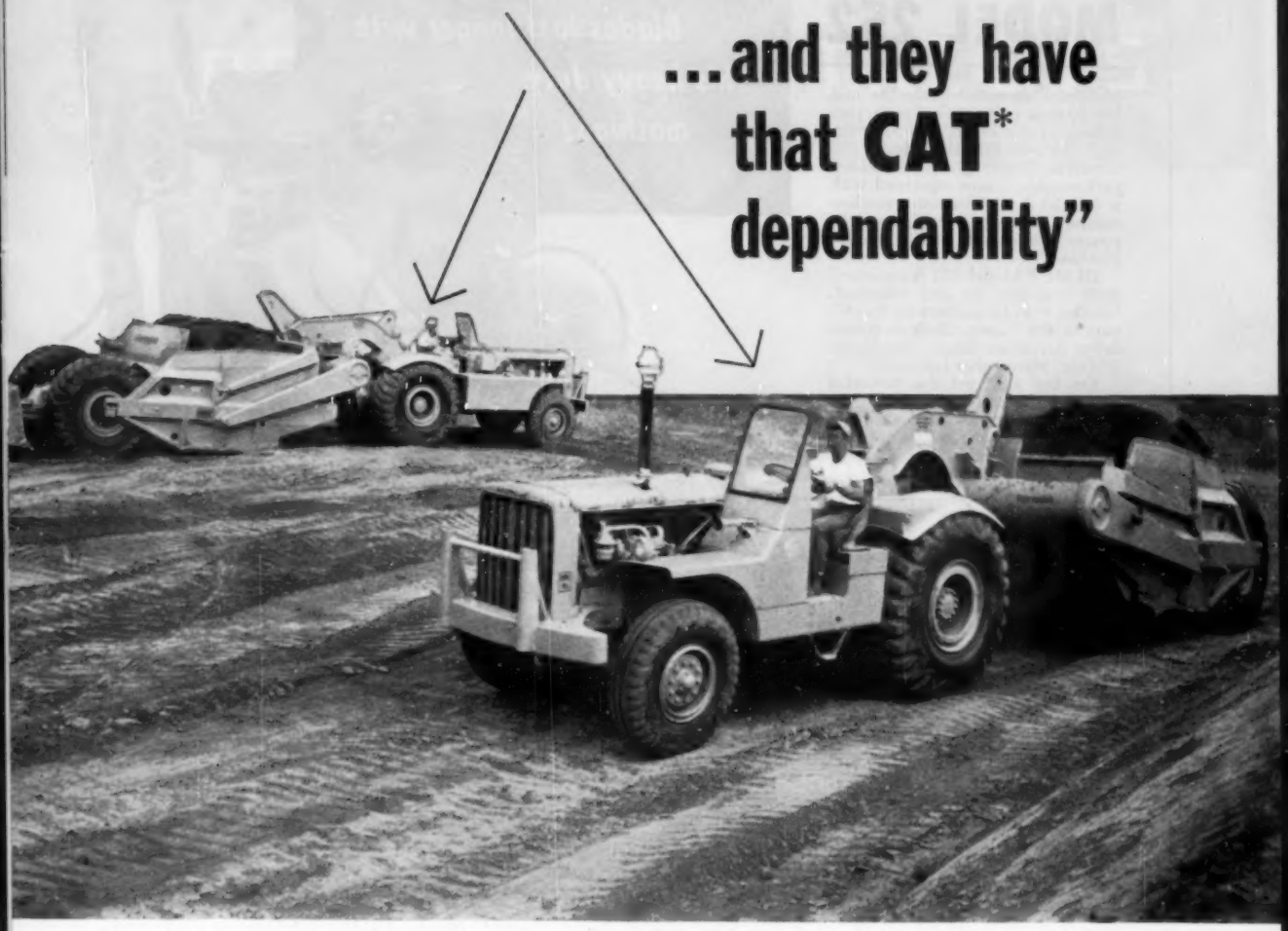
P & H Products Reviewed

A new picture bulletin (G-15) released by Harnischfeger Corporation, 4616 W. National Ave., Milwaukee 46, Wis., carries a listing of products bearing the familiar "P&H" name. The booklet is streamlined with essential facts and capacities on P&H overhead cranes, electric and chain hoists, arc welders, welding electrodes, welding positioners, truck cranes, power shovels, electric shovels, soil stabilizers, diesel engines and also details on P&H prefabricated homes. The bulletin includes a large-size map showing locations of P&H plants, branches, warehouses and parts depots, sales offices and dealers.

For more information circle 138 on Service Coupon Page 16 and mail now.

(Continued on page 160)

"They move plenty of dirt ...and they have that CAT* dependability"



A county road south of Bloomington, Kansas, had to be straightened. Fill for the job—some 70,000 yards of clay and loam—were to come from changing Kill Creek's channel . . . a big assignment that called for fast-stepping heavy-duty machines. G. W. Christolear, of Heide & Christolear Construction Co., Smith Center, Kansas, says, "We looked the earthmoving equipment field over, watched all makes of rubber-tired machines, talked to the owners, and settled on Caterpillar DW15s. The fact that they move plenty of dirt and have that Cat dependability convinced us."

The DW15s on this job haul heaped loads in their No. 15 Scrapers, making an 800-yard round trip in just over four minutes. They go ten hours a day on only 35 gallons of fuel.

These 150-HP four-wheeled workhorses are designed and built for tough, fast, economical work. They offer ten forward speeds to 24 m.p.h.—to 31.3 m.p.h. with optional gears. They perform especially well in narrow, confined areas. And they work smoothly with a complete line of matched units—with scrapers, and with bottom dump and side dump wagons.

But only a real demonstration can show you the DW15's advantages. Call your Caterpillar Dealer today. And remember, he's always handy with competent service and genuine factory parts—parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

. . . for more details circle 175, page 16

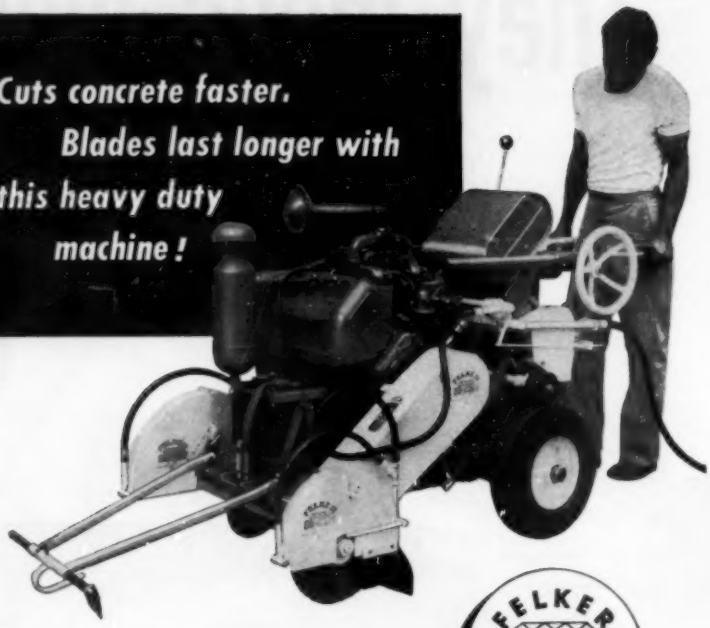
FELKER
DI-MET
MODEL 252

Maximum diamond blade life and low footage costs depend upon *free cutting of the blade, without forcing!* The new DI-MET Model 252 Concrete Cutter gives you added performance... now equipped with a full 26 h.p. Wisconsin gasoline engine... *supplies over 3 times the power available in many smaller machines!*

DI-MET Model 252 is equipped with hydraulic lift and retardant, handles wheel diameters up to 18", cuts to 6½" deep. Built-in power drive decreases labor... increases footage. Many other features.

For big jobs, get the powerful DI-MET Model 252, the *best* machine for control joint and deep slab cutting! Ask for literature on the Model 252 and other DI-MET Concrete Cutters.

Cuts concrete faster. Blades last longer with this heavy duty machine!



FELKER DI-MET SINCE 1924

FELKER MANUFACTURING CO. TORRANCE • CALIFORNIA

World's Largest and Oldest Manufacturer of Diamond Abrasive Cut-Off Wheels and Machines

. . . for more details circle 185, page 16

WHAT ABOUT YOU, MR. READER?

Are you still active in the field? Have you moved or changed your position?

Unless you send this information directly to us we can't be sure. Sometimes a reader's name is cut from the mailing list because we are not sure that our information as to name, title and address is right. *Your* name might be cut from the mailing list.

Don't Let This Happen to You

Even if you think we know all about you, please fill in the information requested below and send to us by return mail. Our auditors require proof of accuracy of our mailing list. *You* are the only person who can help us on this. Do it now before you forget, so you can be sure your magazine will always be properly addressed to you. New names cannot be added or old names retained on our list unless we have *all* this information. *Please print or type.*

ROADS AND STREETS
22 WEST MAPLE STREET, CHICAGO 10, ILL.

DATE_____

☐ I do receive ROADS & STREETS and wish to continue to receive it.
☐ I do not receive ROADS & STREETS but would like to have it.

NAME

TITLE OR OCCUPATION

FIRM NAME OR GOVERNMENT DEPARTMENT (give street address)

CITY (If you have moved give *old and new* address) ZONE (if any) STATE

SIGNATURE

Bituminous ROADS AND STREETS

Published by Gillette Publishing Company,
22 West Maple Street, Chicago 10, Illinois

Cover Scene

Four Caterpillar diesel No. 12 motor graders are spreading road mix on county road in suburb of Seattle, Washington.

Alabama Relocates and Renovates U. S. 80

Notes on the Asphalt Paving Technologists Meeting

Views and Comments — By H. G. Nevitt

MARCH 1955

SATICOY ROCK COMPANY
VENTURA, CALIFORNIA

Selects

MADSEN

Equipment that Serves®

Joining the fast-growing ranks of new MADSEN Asphalt Plant owners is the well known Saticoy Rock Company of Ventura, California. This successful concern has just purchased a MADSEN Model 481 4000-lb. Batch Capacity Asphalt Plant.

One of the big reasons for the sweeping popularity of the MADSEN Model 481 Asphalt Plant is its ability to consistently turn out top tonnage hour-after-hour, day-after-day regardless of the mix specifications. A fast charge-mix-discharge cycle is essential for performance of this type, and the MADSEN Model 481 is capable of the fastest charge-mix-discharge cycle of any batch type plant on the market! This is due, in part, to the MADSEN Asphalt Pressure Injection System (Patented) which pumps the asphalt into the mill in 5 to 7 seconds . . . the faster and more thorough mixing of the MADSEN Twin-Shaft Pug Mill . . . and the all-air operation of bin gates, asphalt pressure injection and mixer gate.

A few of the MADSEN features and advantages are shown below. Check them and you will have part of the story for MADSEN's popularity.

The outstanding MADSEN Model 481 Asphalt Plant . . . available in 4000-lb., 5000-lb. and 6000-lb. capacities to meet your requirements

MADSEN MODEL 481 FEATURES AND ADVANTAGES

Exclusive bin design (Patent Pending) eliminates segregation, provides uniform aggregate withdrawal, and promotes improved aggregate distribution in the weigh-box.

Improved sampling mechanism enables operator or inspector to obtain bin samples easier and quicker and with greater accuracy.

In-built reserve capacity — oversize construction throughout.

Unit construction designed for easy stacking in factory-matched unit sections, factory-fitted for quick field erection.

Operator station located on end of plant away from fumes and heat.

In-built duct work to relieve pressure on mixer weigh-box housings, bin, hot elevator and screen housings to draw off vapors, moisture and dust.

MADSEN
ASPHALT PLANTS and ASPHALT PLANT EQUIPMENT

BALDWIN BLH LIMA-HAMILTON
Construction Equipment Division

Manufactured by
MADSEN IRON WORKS, INC.
Subsidiary of Baldwin-Lima-Hamilton Corporation
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. . . for more details circle 211, page 16

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KOPPERS Tarmac® MAKES BETTER ROADS

. . . for more details circle 247, page 16

BITUMULS® saves you money on maintenance

BITUMULS IS ASPHALTIC BINDER IN EMULSION FORM. Applied cold, it bonds well with every type of clean surface; it thoroughly coats all types of aggregates, wet or dry. It can be used in damp weather and even at relatively low temperatures. For the deep penetration required on trench repair (above), Bitumuls has no equal.

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. . . for more details circle 163, page 16

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manufacturers of fine industrial chemicals

. . . for more details circle 172, page 16

Cold mix from stock pile being used for patching.

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CITY street departments as well as county and state highway departments throughout the country are becoming more and more sold on the *extra value* of McConnaughay Weatherproof Emulsified Asphalt for pavement patching. Mixtures made with these emulsions assure superior results in any season... cold mixtures used immediately or stock-piled for future use... hot mixtures for on-the-spot patching, particularly in cold weather. You can also depend upon these emulsions for durability in application types of patching.

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... for more details circle 210, page 16

VIEWS AND COMMENTS

By H. G. Nevitt

The Two Platoon System Is Out

OUR discussion of fundamentals thus far has been mainly concerned with principles, though often with emphasis on their practical aspects or significance. We have another matter which is essentially a practical one, although the technical problems stemming from it are presently rather challenging. This fundamental is that the bituminous mat must do a complete job, not just perform certain limited functions unobtainable from the foundation or subgrade.

This situation has become critical in the last decade or so. The first visualization of a bituminous road — that it was merely a gravel road with bitumen as the binder in the top layer — has been found deficient, and the concept of a structure composed of a subgrade, a foundation course, and a wearing surface had evolved. The almost universal attitude among road builders was that the former two carried the load, the last merely gave them protection from water and traffic wear. There were a few faint protests against this concept. Over twenty-five years ago we authored an article emphasizing the ability of the asphalt surface to do far more than give some slight distribution of the load in transmitting it to the next layer. We insisted that the mat supplied beam effects and this meant far more effective load distribution, hence diminished demand for base thickness. Hveem developed the cohesiometer test and showed that this property meant a lesser demand on the other characteristics needed by the base, although in his early work he did not assign much weight to the aid so given. However, the majority of engineers felt that this help to the structure by the surfacing layer was so small that it should be ignored in the calculations; that instead it be merely accepted as a fortunate, but small and indefinite factor of safety in the design, not easily calculated.

While the above argument is rarely heard nowadays, it is a practical fact that most of the design methods in use do not credit the bituminous surfacing layer with any extra support value. Nor is there wide acceptance, perhaps not even recognition, that this surface has two functions to perform, and that the best engineering calls for a design that meets both requirements to a reasonable extent. We have in recent years been stressing this point in our discussion of other matters. Technical progress in bituminous design has reached the point where this over-all structural contribution can and should be taken into consideration. We are hence listing this as a fundamental requirement of a properly engineered pavement. Furthermore, we believe that accumulated field data from the various test sections recently completed or under study is making it possible to demonstrate the importance of this effect, showing that it can be present but also absent if the design is not such as to provide it. We hope that these preliminary remarks will arouse sufficient interest in the reader to follow our attempt to explain the situation and its present status.

While the bituminous mat has several secondary duties, it has only two primary functions. The first is to protect the structure from surface failure and water infiltration. It must not rut, shove, or disintegrate (by ravelling, picking out, or cracking); and it must not permit appreciable water infiltration. Practically all of the design techniques commonly used were developed to provide these requirements. While varying in their limits — a design which meets the criteria in one approach may fail to do so in another — they will usually assure satisfactory results in this function.

The mat's second primary function is to assure maximum effectiveness from the road structure as a whole. Being a less tangible requirement, it has not received the attention of the first one. Yet in effect — particularly from the standpoint of over-all cost to do a specific job — it is in the usual case probably far more important. There are few mats built which meet the second requirement but fail on the first; there are many which meet the first but fail on the second — far too many if we recognize how easily these latter could have been modified so as to meet both requirements.

The ability of a well designed asphalt surfacing to add to the load-carrying capacity of a given foundation and sub-grade is not generally realized. There are probably two reasons. Enough mats which fail (unnecessarily, as a rule) to do this exist to obscure the facts. And situations which clearly bring out the facts are infrequent and often not recognized. We have in discussions, both privately and in meetings, referred to the Vicksburg test track studies where, in our view, this situation was spectacularly evident; yet, since the purpose of these tests was quite different, others do not seem to have been so impressed or do not agree with our conclusions. The considerable work now underway will clearly bring out these possibilities. The findings may not be consistent since the surfaces were not specifically designed for this second function. But we do anticipate a number of examples of mats which, whether intended or not, meet both requirements and correspondingly display what can be done to add to the load-carrying ability of the total structure.

If such are the facts, what should be done about the situation? We think at least two, perhaps three, things. The first is to recognize how the wearing course can add to the over-all load-carrying capacity out of proportion to its thickness and resistance to failure within itself. The second is to quickly modify or supplement present design techniques to assure the desired characteristics. The third is to study the whole situation so that it may be both better understood and better handled, if such be possible. We will discuss these three points.

Bearing Value Data

As noted, actual evidence now exists (and there will shortly be more) that the wearing course can add to the bearing value of the structure; the amount of such addition (beyond that accounted for by the additional total thickness it gives) depends upon its characteristics. This added support value due to the beam effect of the mat is dependent upon its flexural properties — essentially its thickness,

(Continued on page 138)

RELOCATE—OR RENOVATE?

A combination of the two was the practical answer for this 13.8-mile section of Alabama U.S. 80

By J. F. Tribble

Assistant State Construction Engineer
Alabama State Highway Department, Montgomery

FLEXIBLE mile-by-mile thinking and planning were found necessary to salvage this old highway and to modernize it for heavy and high speed traffic. Key planning objectives were to salvage as much of the old pavement as possible and to keep major relocations at a minimum. As a result, numerous minor alignment improvements were effected, but only two major relocations were made. This planning not only provided for sound, economical construction, but also conserved property frontage values along the right of way.

"Operations Renovation," known as Federal Aid Project No. 92 (3), began at Line Creek on U. S. 80, 20 miles east of Montgomery, and extended 13.8 miles eastward to within 6 miles of Tuskegee.

The alignment was generally fair, but had narrow and variable right of way; some sections were 50 ft., other 60 and 70 ft. Many buildings abutted the old route, and at one such point, design requirements forced a major relocation. The grade followed the rolling terrain closely and, therefore, sight distances in some sections were poor for fast traffic. The pavement, a 9-6-6-9 concrete slab with ¾ in. marginal bars, was more than 20 years old and pumping. Width in some sections was 18 ft. and in others, 20 ft. Maintenance had become difficult and expensive, even though the pavement had been resurfaced with bituminous plant mix.

Three existing bridges on the old route required replacement.

Design Features

The new road is designed for 18,000-lb. axle load and 70 mph speed, with a minimum 120-ft. right of way, while the bridge design conforms to AASHO designation H20-S16-44.

Typical roadbed section is 24-ft. bituminous pavement (double surface treatment and plant-mix wearing course) and 10-ft. shoulders. In new locations, the base consists of 4 to 6 in. subbase and 10-in. base course for the full roadbed width of 44 ft.

Where the new grade and alignment coincided with the old route, bituminous or gravel overlays were specified as methods of salvaging the existing pavement. The bituminous overlay includes a plant-mix levelling course (type B); while the gravel overlay consists of 8 in. of base course materials. The wearing course for both overlays is a dense-graded bituminous plant-mix (type 1, Mix A) 80 lb. per sq. yd.

Gravel overlay requirements included removing the old bituminous surface, breaking the concrete into fragments ¾ sq. yd. or less, and filling voids immediately with sand before laying any gravel. As an experiment, the old concrete was not broken for 7,500 ft. at the beginning of the project. At all other similar places, however, where gravel overlay was used, the concrete was broken, as required.

Since the project route is well-drained, extensive drainage renovation was not necessary and was limited wherever feasible to extending existing culverts.

Reconstruction of existing shoulders was required in all overlay sections to provide a new 44-ft. roadbed of subbase and base course. In some of these sections, variable widths of shoulders were paved with double surface treatment to meet design requirements.

Since a one-year construction period was anticipated, special consideration had to be given for handling the traffic between Montgomery and Tuskegee, an estimated daily detour volume of 2,100 vehicles.

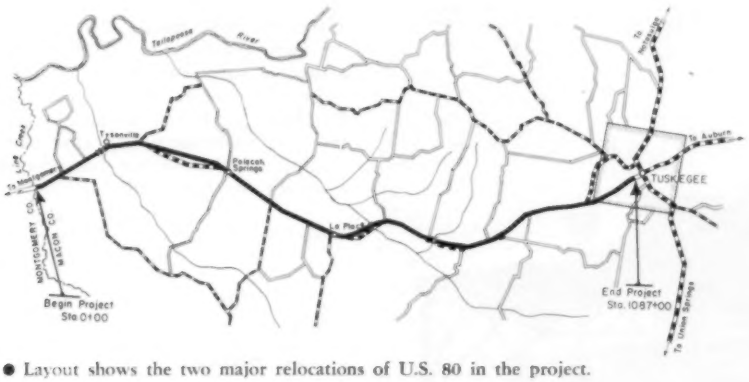
A study of existing routes disclosed

Modernizing Old Outmoded Highways
•
One of a Series

● How traffic was maintained during construction in major grade change area.

● Breaking old concrete pavement with heavy iron casting attached to Lorain shovel.

● Removal of old concrete with LeTourneau scraper and Caterpillar D8 pulling and pushing. Note small size of fragments and paved shoulder for traffic detour.



● Layout shows the two major relocations of U.S. 80 in the project.

that two possible detours were available: one over state roads, the other over county roads. Neither one upon analysis, however, proved to be practical or in the best public interest.

The state-road detour necessitated 20 miles of excess travel, also through construction, and would have penalized the travelling public more than $5,000 per day, based on an estimated 12 cents per mile for composite vehicle operating cost of cars, truck, and buses. Whereas, selection of the county-road detour, involving 15 miles of excess travel, was deemed unwise since the roads were not built for such heavy traffic.

As a result, it was decided to maintain traffic through the construction area, by providing temporary pavement, barricades, lights, signs, and a special traffic scheme as part of the contractual requirements. This scheme was as follows:

(1) Wherever possible, traffic would be routed over the existing pavement while base course and paved shoulders were being constructed on one side at a time.

(2) Where existing pavement was broken or removed, traffic would be routed over the paved portions of the shoulders when they were completed. The pavement shoulders would be part of the permanent improvement.

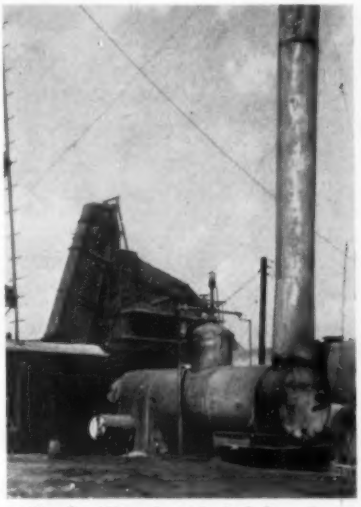
(3) In the new relocation sections, temporary detours outside the roadway area or at sufficient distance from the construction work, would be furnished.

(4) The existing bridges would not be demolished until the new structures replacing them were completed. The bridge approaches would be either existing pavement or temporary detours.

Although a big money feature of the contract, the state had no other economical alternative and therefore, felt justified in expenditures for maintenance of traffic on pavement. Quantity measurement at regular unit prices were accordingly established for building, furnishing and removing the temporary traffic structures.

Economical Job Materials

The project soils were generally granular and favorable for subgrade,



● Vandigriff's plant included a Lucey boiler fired by a Houck fuel oil vaporizing system.

● Bottom base material being dumped on new alignment and grade section.

● (Left): Final rolling immediately prior to application of prime coat. International tractor. (Right): Loading weathered topsoil from stockpile with Link Belt Speeder shovel for bottom base use.

● Vandigriff produced sand and gravel for the U.S. 80 and other local projects in this 3-bin plant set-up.

● Plant mix for the 80 lb. per sq. yd. wearing course was produced in a Barber-Greene assembly which included an HD848 mixer. Dust collector in foreground.

ranging from hard-bonded silt-clay through red sand-clay and weathered silty sand. Abundant deposits of granular weathered topsoil and clay-gravel were readily available along the route for base course. The clay-gravel met the low P. I. requirements for top base, while the weathered topsoil met requirements for bottom base. Typical analyses of the base course materials are tabulated.

Total Passing Sieve	*Percentage by Weight* Gravel	Topsoil
1 inch	100	100
No. 4	71	100
No. 10	53	100
Soil Analysis	*Values*	
Liquid Limit	21	23
Plasticity Index	5	4
Shrinkage Limit	16	18
Volume Change	1	1

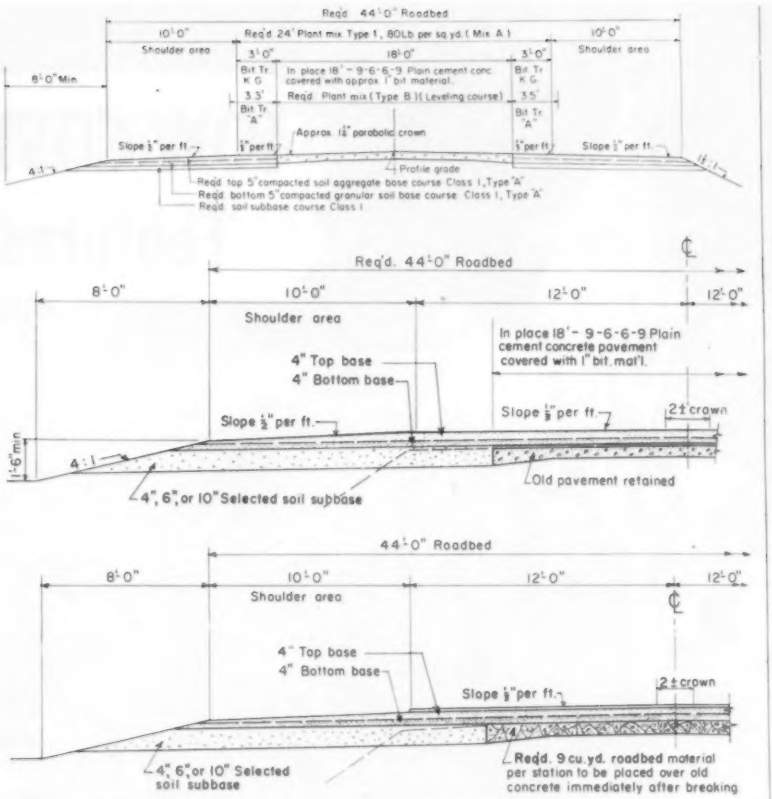
Cutback asphalt MC-1 was used for the prime, and grade AC-12, penetration 120-150, was used in the double bituminous surface treatment with crushed slag aggregates.

The bituminous plant mix for the wearing course, using locally produced aggregates, was manufactured at the contractor's plant near the job site. Grade AC-8 asphalt cement, 85-100, was used at a rate of 116 pounds of asphalt per ton of mixture. The mix was laid by a Adnun paver at a temperature of 290° F. The job mix was as follows:

Total Passing	*Percentage by Weight*
½ in. sieve	100
⅜ in. sieve	93
No. 4 sieve	75
No. 10 sieve	60
No. 20 sieve	45
No. 40 sieve	25
No. 80 sieve	11
No. 200 sieve	2.5

Project Cost

The road contract was awarded in December, 1953, to Vandigriff Construction Co., Montgomery, for $607,042. George W. Norrell Contracting Co., Georgiana, Ala., received the bridge contract at $239,768. All pavement was scheduled for completion by November 1, 1954; bridges and other items by January 1, 1955.


Reqd. 44'-0" Roadbed
10'-0" Shoulder area
Req'd 24' Plant mix Type 1, 80Lb per sq yd. (Mix A)
10'-0" Shoulder area
3'-0"
18'-0"
3'-0"
8'-0" Min
Bit Tr K G
In place 18' - 9-6-6-9 Plain cement conc. covered with approx 1" bit. material.
3.5'
Reqd. Plant mix (Type B) (Leveling course)
3.5'
Bit Tr "A"
Approx. 12" parabolic crown
Bit Tr "A"
Slope ¼" per ft.
¼" per ft.
¼" per ft.
Slope ¼" per ft.
4:1
Profile grade
Reqd. top 5" compacted soil aggregate base course Class 1, Type "A"
Reqd. bottom 5" compacted granular soil base course Class 1, Type "A"
Reqd. soil subbase course Class 1
Req'd. 44'-0" Roadbed
8'-0"
10'-0"
12'-0"
12'-0"
Shoulder area
In place 18' - 9-6-6-9 Plain cement concrete pavement covered with 1" bit. mat'l.
4" Top base
4" Bottom base
Slope ¼" per ft.
Slope ¼" per ft.
2± crown
1'-6" min
4:1
4", 6", or 10" Selected soil subbase
Old pavement retained
44'-0" Roadbed
8'-0"
10'-0"
12'-0"
12'-0"
Shoulder area
4" Top base
4" Bottom base
Slope ¼" per ft.
2± crown
4", 6", or 10" Selected soil subbase
Reqd. 9 cu. yd. roadbed material per station to be placed over old concrete immediately after breaking

● Several of the cross-sections developed for the U.S. 80 modernization.

On the above project John Harmon represented Vandigriff Construction Co. and Grady Norrell served George W. Norrell Contracting Co. as superintendents. General supervision for the department was by Marvin Taylor, state construction engineer and for the U. S. Bureau of Public Roads, B. A. Scott, district engineer. Supervision at Division level was by Wm. P. DeJarnette, division engineer. Job supervision for roadwork was under Redford E. Howell and later Dwayne T. Bentley, project engineers. Clayton B. Miller was project engineer for the bridge contract.

Notes on bituminous overlay pavement

The importance of thorough conditioning of a concrete pavement before resurfacing with hot-mix asphaltic concrete was revealed in a report given at the recent Highway Research Board meeting in Washington. The source was a paper on a 4.5-mi. Ohio highway project by Fred W. Kimble, Ohio Department of Highways.

Approximately 3,300 sq. yd. or 5 per cent of the old pavement was removed and replaced before resurfacing. Two-thirds of the patches were plain concrete and remainder was flexible pavement. Minimum size of patches was 4x4 ft. with sides kept parallel or perpendicular to the center-line.

Wet subgrade areas were removed to the affected depth, then shaped and compacted by machine or hand, before placing and compacting base material. All concrete patches were 9 in., except for the minimum size, which was 12in. thick and had undercut edges.

Flexible pavement patches consisted of 5-in. dry macadam (3½-1½ in.) with limestone screenings and 3-in. bituminous macadam (¾-⅜ in.) well compacted. Resurfacing courses included a minimum 1¾-in. leveling course and 1¼-in. surface course, both of the same type of hot-mix with ⅜-in. maximum aggregate.

Although it is still to early to prove the full economical savings, annual conditions surveys reveal that the pavement is in good condition and it is anticipated that the extra reconditioning cost will be more than justified by continued good service and performance.

GRACE Asphalt and Compaction Equipment

3 sweeper models, axle, engine or tractor powered.

Chip spreaders 8' to 12' width. Also asphaltic concrete spreaders.

Rapid Fire circulating heaters heat and unload large tanks of asphalt.

Sheepsfoot Rollers 250 to 600 psi.

Rapidspray Maintenance Distributors. Also heaters for production melting of barreled asphalt.

Pneumatic rollers 7 to 50 tons.

W. E. GRACE MFG. CO.

6007 S. Lamar Dallas, Texas

. . . for more details circle 262, page 16

Good Roads INTRODUCES THE "ODELL" SPREADER

Three years ago Robert Odell, a general contractor, designed a new hopper-type asphalt and aggregate spreader for his own use, since no spreader on the market satisfied him. It worked so well that other contractors asked him to build similar machines for them. A total of five were made, and all of them have been operating successfully for the past two years.

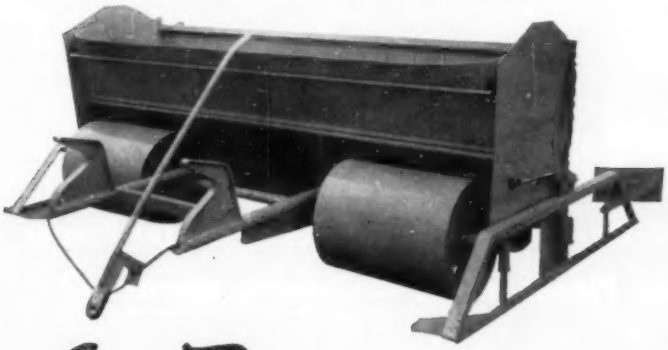
Good Roads bought the basic design from Odell, and now manufactures and offers the "Odell" spreader as a standard item in its complete line of road construction and maintenance equipment. Except for minor changes to adapt it to factory production and strengthen certain components, it is the same unit that has been successfully field-tested by Odell and others.

AGGREGATE AND ASPHALT SPREADER VERSATILITY, ACCURACY AND SPEED

Outstanding in the "Odell" Spreader is its extreme simplicity of design—permitting a single low-priced machine to perform a wide variety of spreading operations easily and quickly.

It hooks to any standard dump or semi-dump truck in just a few seconds without the use of truck-mounted attachments and is transported between jobs on the truck tailgate. When spreading, the hopper rides on wide steel rollers which travel over sub-grade or base without digging or gouging. Smooth, accurate spread is assured by a "strike-off" unit that floats free of the hopper, on 6-ft. long steel runners.

Hot or cold-mix asphalt, bank-run gravel, coarse or fine slag and limestone, cinders and practically any kind of base materials can be spread to any thickness from feather-edge to 8 inches. Over-all width is 8 ft. 6 in. for laying an 8 ft. spread. Unit may be blocked off for any width under 8 feet, and can be extended to 10 feet in a matter of seconds.



Sturdy all-steel welded construction design provides durability with light weight. Low initial cost and exceptionally fast operation means big savings on all kinds of paving jobs from pathways or small driveways to large highways, parking lots, airport taxi strips or runways.

Good Roads "HANDY" AGGREGATE SPREADER

For accurate, smooth laying of sand, gravel, cinders, stone, etc. Good Roads offers the reliable "Handy" aggregate spreader. Flexible keyboard gate of tempered spring-steel fingers permits oversize particles in material to drop through without marring the spread pattern. Spread is controlled up to three inch depth by micrometer adjustment.

All controls are conveniently located for simple one-man control. One man can hook-up, start, stop, forward or reverse from one control point.

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GOOD ROADS MACHINERY CORP., MINERVA, OHIO

ESTABLISHED 1878
Good Roads MACHINERY CORPORATION

SNOW PLOWS | ICE CONTROL SPREADERS | AGGREGATE SPREADER | LEAF COLLECTOR | SCAVENGER

. . . for more details circle 238, page 16

LUCAS
ASPHALT COMPACTOR

Eliminates Hand Tamping

This portable, precision-built compactor is used for tamping and rolling asphalt close to walls, light poles, traffic signals and in all inaccessible places . . . and for use on all types of asphalt patching and repairing jobs.

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LUCAS ASPHALT COMPACTOR COMPANY

2209 E. Market St. **Stockton, Calif**

. . . for more details circle 264, page 16

Views and Comments *(Continued)*

and its ability to develop tensile resistance since the other beam requirements (namely, compressive and shear resistance) — are obviously present in any usual pavement.

The flexural resistance works in two ways, with the two effects mutually helpful. The mat acts as a continuous beam— or, more strictly, as a plate distributing load in all directions. Under the wheel there is a positive bending moment, with the lower portion in tension; this effect (supplemented by shear resistance from the base) adds to the distribution effect of the layer by shear. Adjacent to the wheel there is a negative bending moment, with the upper half in tension; this stress comes from the tendency of the base to be displaced. The downward stresses under the wheel develop horizontal components in the base, which in turn result in a vertical upthrust adjacent to the loaded area. The bending resistance of the mat thus adds to the surcharge effects from its weight. There seems little doubt that this negative bending resistance is the important one, and hence should be thoroughly understood. Any theory of granular mass resistance indicates that the leverage against base flow provided by this restraint against vertical movement is very great; therefore the appreciable increase in base strength brought about by such a surface can be readily understood. Highway engineers will find such an analysis instructive.

If moderate beam strength in the mat is so effective, how do we assure it in the design? If the Marshall method does so, it is only indirectly; probably the same is true of the triaxial approach. Anyone dealing with the Mohr diagrams encountered in actual practice will be very cynical

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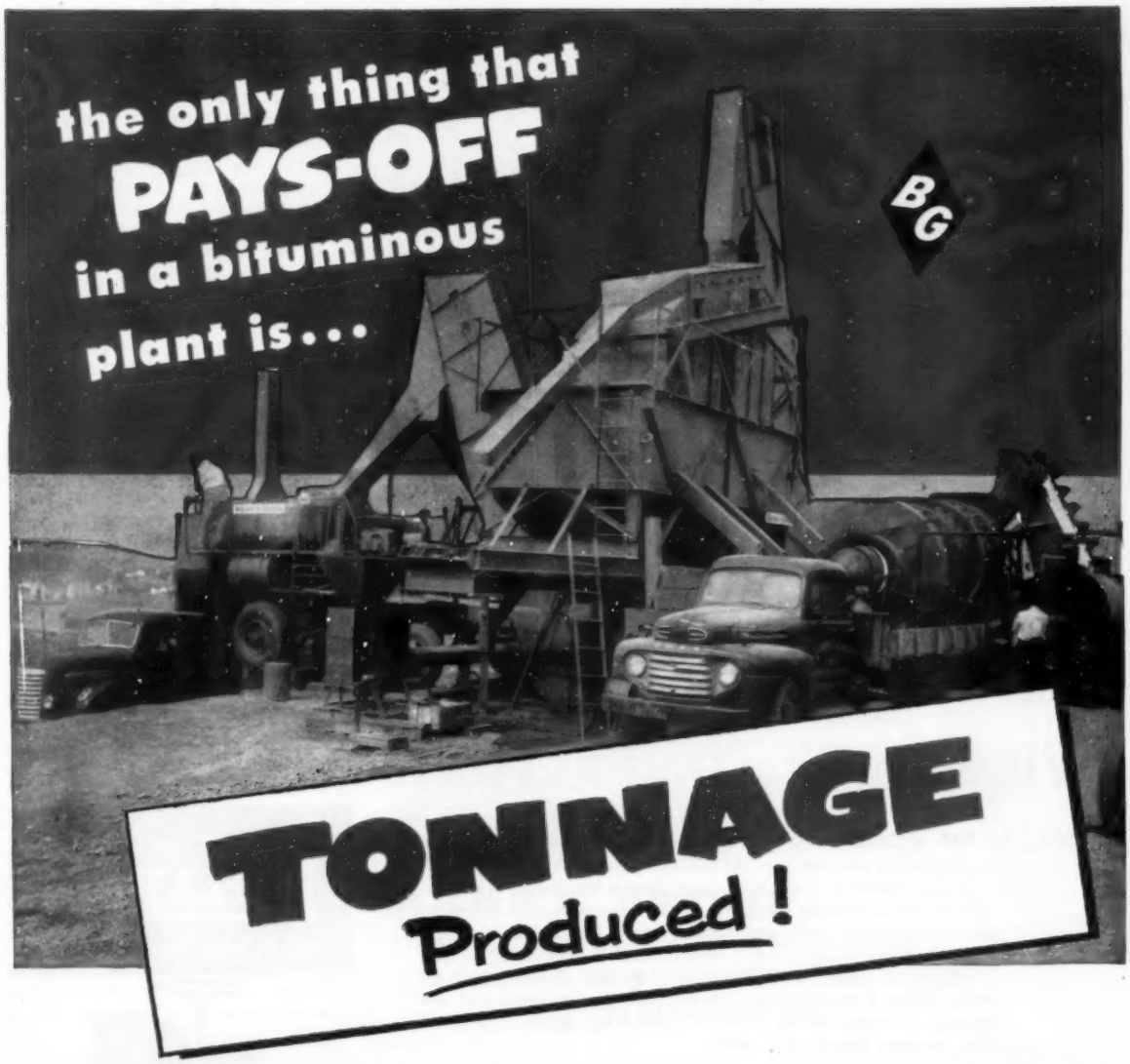

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Its portability means less moving time. Its separate components mean less set-up time. Its automatic, interlocked operation assures accuracy and means less loss due to the human element.

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about relying on their tensile values; and of course the tensile strength indicated must be converted into practical beam strength. The stabilometer-cohesiometer method does directly recognize and test such beam strength. We are not in a position to say whether it appears in the recommended formulae in a manner which agrees with the flexure theory, taking into account the tensile resistance and the various layer thicknesses. And we have some doubts as to whether the test apparatus used involves localized stresses that may vitiate the results. However, this approach definitely attempts to evaluate the true situation; it should be readily susceptible to any improvements if such are found needed. The others obviously should be supplemented.

The beam test would seem the obvious one to bring in; the English have done good work on this. However, the compaction problem with it is serious. We doubt if the beam approach will be too good, or popular if the proper laboratory techniques are followed, until some easier method of satisfactory compaction become available — such as through the vibration approach discussed at the

Compacting sub-base on the Ohio Turnpike.

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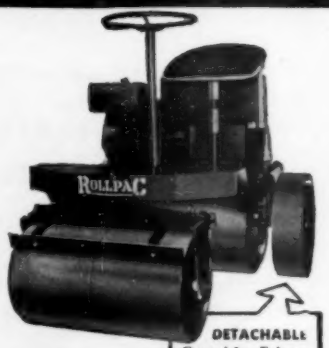

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● New headquarters building being built for the Asphalt Institute at College Park, Maryland.

AAPT Louisville meeting in 1954.

Another problem is the correlation of beam values (properly obtained or calculated) with the support allowance to the base resulting from them. There is considerable disagreement among the experts on the theory of granular structure resistance to direct compressive stresses. Consider the action of a beam — not composed of a rigid and truly elastic material, but rather of a granular, liquid-bound mixture subject to compaction and perhaps some internal adjustment while flexing a beam over such a granular mass poses even greater questions. We personally doubt the applicability of the mathematically correct elastic theories so far proposed; they are too much dependent on the correctness of the assumptions, too influenced by the values used for the modulus of elasticity. The results seem to neither fit the observations of practice nor the limited data so far available to test the relationships. Perhaps for the present we will have to depend upon some empirical correlations which tie the beam strength to the support value given the whole structure by it. Certainly this will be a long step forward from no recognition of the possibilities of added support; the savings in the base structure, when the flexual resistance which can readily be built into the mat is provided, will certainly be well worthwhile.

More Study Needed

We think it obvious that this matter of additional structural strength is worthy of much study. We need the better correlation between the mat beam or tensile strength and the total supporting value noted above; we need more accurate theories and formulae characterizing the effect and evaluating the variables involved; in brief, we need a better understanding of the detailed mechanism.

At the same time we need more attention to mat characteristics that will improve this beam action. Present ideas are merely that: While probably accurate, at least qualitatively, these ideas need quantitative evaluation. Undoubtedly gradation, binder and perhaps some other factors have a considerable influence on this beam strength; we must know how and how much, using test methods that duplicate actual road effects. A study of the data as it becomes available — or is worked up from past investigations — will show that a wide variation in the added support power from the mat exists; we must learn how to assure the maximum effect possible with local conditions and other considerations.

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The Don Wells-Cummer Portable pictured here is completely wired, ready to plug in to a diesel generator set. Lifting hooks are installed for speedy handling. Folding legs (for example, on the dryer) fold up to frame, fold down to grade on timber foundation — concrete is not necessary. Note dust-collecting equipment which discharges reclaimed dust into hot elevator.

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Surface Treatment Reviewed By Asphalt Technologists

Symposium on bituminous surface treatments highlights Annual Meeting of the Association of Asphalt Paving Technologists at New Orleans.

THE subject of sealcoats or surface treatments for existing bituminous surfaces was one of the features of a varied technical session at New Orleans, where the Association of Asphalt Paving Technologists held its annual meeting, February 7-9.

Chairman of the symposium was William H. Goetz, research engineer, Joint Highway Research Project, Purdue University.

Panel members were E. C. Herbert, Bitucote Products Co., St. Louis; William H. Schuelie, manufacturers' representative, New York City; J. R. Harris, supervising field engineer, Texas Highway Department, Austin; and J. T. Pauls, physical research branch, Bureau of Public Roads, Washington, D. C.

Current specifications, construction methods and new equipment were the general topics covered by the panel members, as well as particular viewpoints on technique.

Some key points which emerged from these presentations and during the discussion period by members of the audience follow.

Mr. Herbert, in reviewing the general aspects of the subject, stressed the need for revitalized thinking on fundamentals. These include the aims, advantages and limitations of surface treatments.

Heavy, single-pass sealing was noted to be the biggest item in treatment work. It is especially favored for its low cost, simplicity, speed of work, and satisfactory driving surface. Average material quantities per sq. yd. were given to include 0.35 to 0.4 gal. of bituminous material and 18 to 25 lb. of aggregate, usually ½ to ¾ in., maximum.

Mention was made of thicker treatment application which in some cases give a surface life three times that of single surface treatments. Possible trend may be toward heavy aggregates and thicker bituminous applications with RC's and RS's.

Several recommendations were offered by Mr. Herbert. One was that since weather and atmospheric conditions are critical, surface treatment work scheduled for late season construction should be moved up to the warmer months for best results. Another was that every attempt should be made to allow for proper curing before opening to traffic.

The second panel member, Mr. Schuelie, reviewed the equipment now in use and that being presently developed by manufacturers. Design emphasis is especially being placed on maneuverability, simplicity, and greater production, with the trend definitely toward self-propelled units. Of particular interest was the mention of self-propelled spreaders, for which it is claimed that not only is spreading faster, but aggregate uniformity and texture are also better. Truck hook-ups are reduced, extraneous foreign material is retained in the spreader box, and the discharge feed is regulated so that coarse material falls first, followed by finer fractions. Certain improvements and refinements are also in the offing on

(Continued on page 146)

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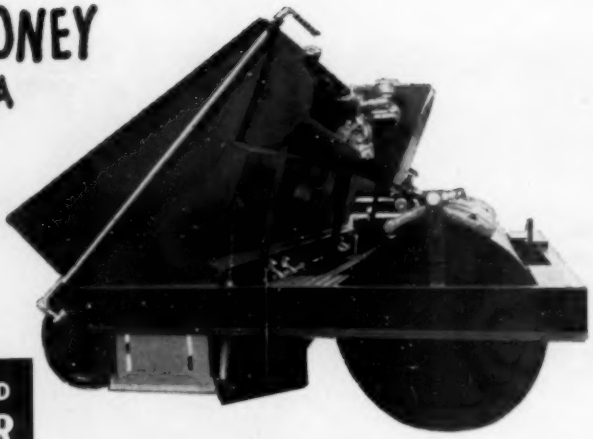

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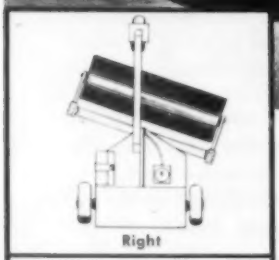
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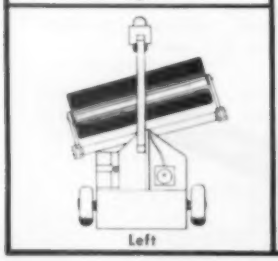
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Carnaghi digs into lubrication problem...comes up with answer

Ray J. Carnaghi (right) discusses lubrication of equipment with Frank Wolan, Standard Oil automotive engineer. Frank has been serving customers for Standard Oil since completing the Standard Automotive Sales Engineering School. He got his engineering training at Michigan State College. Customers have found Frank's experience and training pay off for them.

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MOTOR OIL

Like every outfit in the business of moving earth, Joseph P. Carnaghi & Sons, Detroit, know what it means to keep equipment on the move. There is no place on the schedule for stuck rings, bearing failures, fouled plugs. Down time due to lubrication failure is something Carnaghi learned how to eliminate 20 years ago. It was then that this contractor began using Standard Oil products.

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Asphalt Technologists *(Cont.)*

other equipment, such as heater-planers, brooms, pressure distributors, and rollers. These all will enable greater control on the quality of treatments, as well as possible reductions in overall cost.

Texas Practice

Bituminous surface treatment methods in Texas were presented in detail by Mr. Harris, the third speaker.

The state usually selects penetration asphalt cement (135 to 230) for bituminous binder with application temperature approximately 350° F. Aggregate is washed gravel, crushed washed gravel, or crushed stone.

Recognizing that uniform application of bituminous material is a primary requirement, special attention has been given to the pressure distributor and its operation to eliminate streaking. Four conditions were pointed out as the causes responsible for streaking; namely, spray interference between adjacent nozzles, improper pump pressure, improper spray bar height, and clogged nozzles. Each is treated respectively in the following manner.

(1) The long axis of the nozzle opening is set at a 30° angle with the spray bar length. This is done with special wrenches commonly furnished by manufacturers.

(2) The highest possible pump speed or pressure which does not atomize or distort the spray is selected. This is found by field trials in which the speed or pressure is increased in definite increments, using only the center spray bar section until the maximum is reached which still gives the required spray conditions.

(3) Spray bar height is determined by field testing on a damp or dust free surface. Again, only the center bar section is used. Alternate nozzles are plugged and bar heights adjusted until an exact single lap is produced on the surface. Once this is accomplished, exact double lapping will result when all nozzles are operating.

(4) Test shots made off the road are required prior to any bituminous application. Any clogged nozzles that are discovered must be cleared or cleaned, before shooting is permitted on the road.

On the subjects of drag-brooming and rolling, Mr. Harris had some acute observations. Drag-brooming is omitted and pneumatic tired rollers are favored over steel wheel. Coverages usually number ten. Rolling speeds are slightly less than that which would produce aggregate pick-up by tires.

The one controlling and troublesome problem encountered in the state is still that of traffic during construction. How to keep it off the construction area until a section is completed is difficult. Traffic is usually detoured on shoulders that have been dust treated by water or a mixture of water and emulsion. This latter treatment has given satisfactory results and is widely used. The ratio of mixing is 5 per cent medium curing emulsion and 95 per cent water, with emulsion being fed into a tanker prior to the addition of water.

Where traffic cannot be maintained on shoulders, half-width treatment is practiced. Noteworthy is that on heavily traveled roads, the state has another solution, namely, pre-coated aggregates. Use of such aggregates permits opening a section to traffic within an hour after completion.

The last panel member, Mr. Pauls, gave a comprehensive round-up of the general specifications and quality control employed to obtain satisfactory surfaces.

Contractor View Points

The discussion period evoked numerous comments from the audience of which a few are here noted:

- An Arkansas contractor concurred that drag-brooming was detrimental if

done heavily, but does help when done lightly with a lightweight drag. This contractor reflected that on some of his jobs, a cut-back asphalt with a rubber additive produced good adhesion even with aggregates unsuitable with most bituminous binders, commonly specified.

● Another contractor remarked that in Ohio the cost of specified aggregate and bituminous material represented from 80 to 90 percent of the total job. Possible changes or greater flexibility in specifications might reduce such high costs if put in effect. Another expensive item is traffic maintenance which should be solved either by using state policemen or other law enforcement units. Contractors, it was opined, are not trained traffic controllers, and, consequently, production suffers on a job.

● On the subject of pre-coated aggregates it was conceded by several that their higher cost restricts their use in most cases, especially where low cost is mandatory for sealcoating.

● A Kansas City engineer disclosed that for city work it is in the long run more economical to obtain a high quality surfacing, even at premium prices. This has been found to be justified since the cost of cleaning up loose aggregates and possible traffic accidents from such surfaces are much greater prices to pay than the cost of doing the job well in the first place.

● Self-propelled spreaders and pneumatic-tired rollers enabled a contractor to increase production by 3,000 sq. yd. per day with better results, as compared with towed spreaders and steel wheel rollers previously used. It is the intention of this contractor to use only self-propelled units on all of his treatment work.

AAPT Elects New Officers and Directors

President: George H. Dent, Asphalt Institute, College Park, Md.

1st Vice President: Carl A. Carpenter, Bureau Public Roads, Washington, D. C.

2nd Vice President: J. R. Banning, Asphalt Institute, Denver, Colorado.

Secretary-Treasurer: Ward K. Parr, Michigan State Highway Department, Lansing, Mich.

Directors-at-Large: William H. Goetz, Purdue University, Lafayette, Ind.; Harry G. Nevitt, Consultant, Kansas City, Mo.

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Rubber Hydrocarbon	Binder Content		
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3%	6 pounds	7.5 pounds	9 pounds
4%	8 pounds	10.0 pounds	12 pounds
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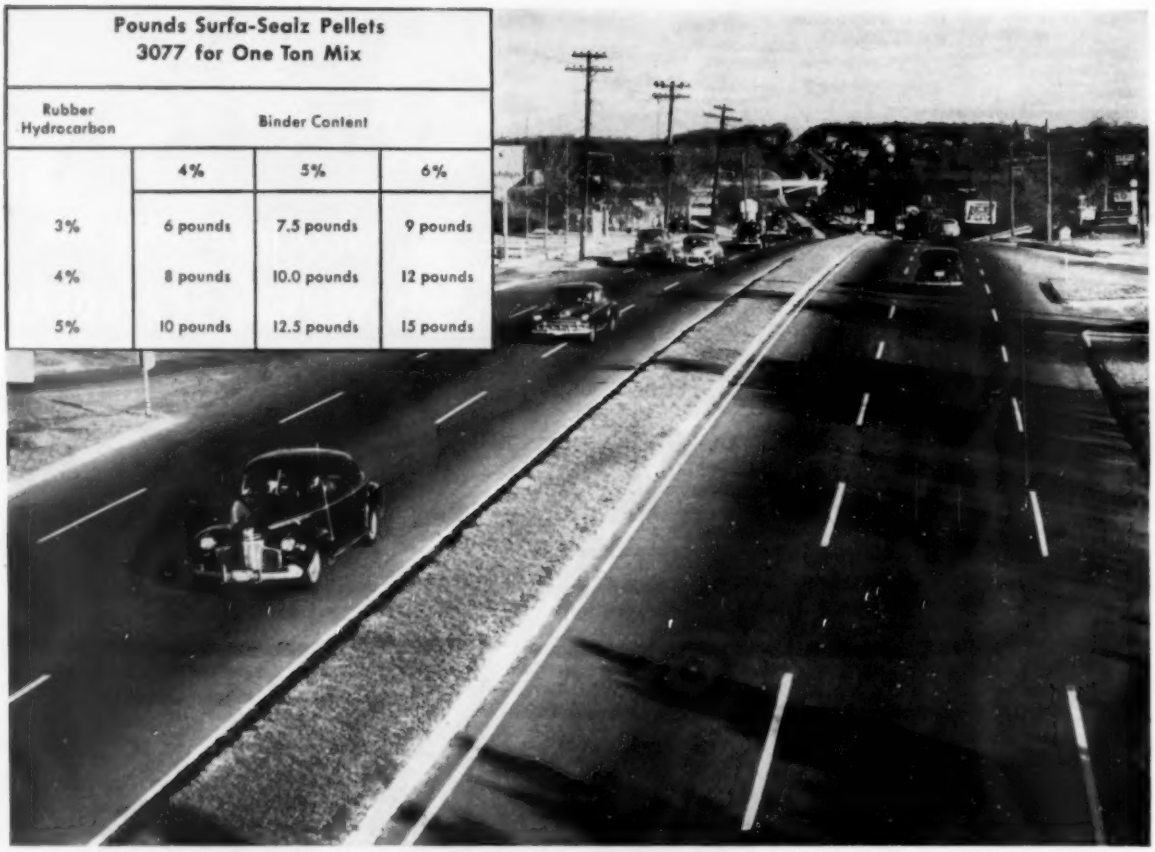

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All boilers are equipped with oil burners

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Complete In Good Operating Condition

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2—24/00x29" 24 ply New
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1—116 Galion Patrol
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21:00x24 Tires
1—12 Cat Patrol Late
1—Tandem Cummins transport

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Rex Model GG-34E Dual Drum New in 1947—in Good Condition.

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28 x 36 Traylor Jaw
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3 — 8 Tyler Niagara Screen
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1—**Hough HR** Payloader, 1 yd. capacity, 4-wheel drive. Excellent condition.

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Suitable for Dragline, Cranes, Air Compressors, Pumps, Generators, etc.

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1 27-E2A Koehring Paver (Location Boston, Ohio).

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1 117 foot concrete tower with necessary equipment for hoisting 1 cubic yard of concrete and thirty foot material boom (No Hoist) (Location Boston, Ohio).

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6160 Bucyrus Monigham Dragline, 165 ft. boom, 8 yd. bucket, FM diesel engine. Recently built. Bargain

621 Page Diesel Walker, 135 ft. boom, 6 yd. bucket. Excellent condition.

4500 Manitowoc Combination, 5½ yd. shovel, 140 ft. boom, 4 yd. dragline, D-386 Caterpillar engine. Excellent condition. Priced right.

4500 Manitowoc Dragline, 140 ft. boom 5 yd. bucket, D-386 Cat. engine. Fine condition.

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Ingersoll Rand Quarrymaster blast hole drill.

58BH Joy Champion Electric 7⅞ in. blast hole drill.

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Link-Belt 75, comb. Crane, dragline shovel.
Lorain (2) 50-K, Crane Dragline-shovel.
Marion 93M Crane-Dragline.

BUCKETS
¾ to 4 yd. dragline buckets.
¾ to 1½ yd. clamshell buckets.
½ to 2 yd. concrete buckets.

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2—I-R 500 CFM Diesels.
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Littleford Model 3500.

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1½" to 6" centrifugal.
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Clyde & American, 1, 2 & 3 drum.

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1—TD-9 with dozer & winch.
1—HG-42 Oliver with dozer.

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Wagon drills, jack hammers, air hoists, tampers, paving breakers, riveting tools, woodborers, impact wrenches, concrete vibrators.

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Mall, Vibor Pluss (gasoline).

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20" band, Skil, radial, DeWalt, table, Skil Saks — hand, C-P (air), chain, Wright (air) chain.

SAND BLASTERS
Pangborn (wet).

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Size 27 inches tall, 21 inches wide, 20 inches deep. 6 drawers, 22 compartments, heavy plywood constructed, 4 carrying handles, has detachable door or lid. Cost the government $78.00 each. Our price, $8.00 each, F. O. B. Vanceburg, Kentucky.

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EQUIPMENT PRICED FOR QUICK SALE

P&H 655, 1½ yd. shovel front, 1946, extra bucket, 13,000 Cat diesel.
Bucyrus-Erie 22-B, ¾ yd. shovel front, 1948, Buda diesel.
Northwest Model 6, 1½ yd. shovel front, 1950, Murphy diesel.
AC HD-14 & AC HD-10.
Worthington air compressor, 315 cubic, 1953, International diesel.
Galion Chief 10 ton roller, 1948.
Ingersoll Rand wagon drill, 1953, heavy duty, rubber tired.
D-8 Angle Dozer, 2 U Series, 1953 model.
Le Tourneau Scraper 15-19 yd.
Federal Tractor, Model 65, 1948, and 25 ton low-boy trailer. Excellent tires all around.

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WILL DISCOUNT AED RATES TO RESPONSIBLE PARTIES

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⅜ c.y. Shield Bantum shovel.
⅝ c.y. Quickway Tr. crane.
D-8 tractor & bulldozer.
D-4 tractor, 1 c.y. hyd. loader.
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Galion 202 motor patrol.
A-C model D motor patrol.
A-C model W Maintainer.
500 c.f. Cat diesel compressor.
250 c.f. Cat diesel compressor.
105 c.f. Tractair on rubber.
24' Jaeger conc. finisher.
28' x 55' steel barge, 18 ton crane, 65' boom.
M-115 piling, random lengths.
4' x 8' conc. panel forms.
1 ton rollo pack, roller.
3 ton CHE, tandem roller.
10 ton A-W 3 wheel roller.
1,000 gal. bituminous distrib.

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Barber-Greene Model 848 Hot Mix Plant, 110 to 120 TPH

Pugmill Unit w/GMC Engine, new November 1953 — Hot Elevator Unit between graduation unit and mixer — Graduation unit with Simplicity Screen — Hot Elevator w/Ford 6-cyl. engine dryer to graduation unit 64 buckets — Dryer dual drum, new drum 1953 — Cummins Diesel engine new 1952 — Cold elevator 64 buckets — 2-aggregate feeder — Dust collector and pipe, shop built, with LeRoy Engine and Model 291E Clearage Fan, Price $39,900.00

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VANDEVENTER AUTO SALES
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FOR SALE

1/2 yd. Insley combination backhoe and 45 ft. Boom-Crawler Crane. Machine in A-1 condition. Just put $1,000.00 repair on it. Good shape. $5,500.00
Rex 2-3 yd. horizontal mixer. Good — make offer.
1 Vibrator, Roeth 4 hp. Good $100.00
1 Practically new Page Drag-bucket. Used 10 hours $550.00

WANTED — Or Will Take In Trade
Backhoe for HD-5.
Schield Bantam Truck Crane.

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EACH PIECE POSITIVELY SELLS TO THE HIGHEST BIDDER WITHOUT LIMIT OR MINIMUM

AT EACH OF THESE FORKE BROTHERS SALES

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MONDAY, MARCH 21st

Full line of asphalt, concrete and dirt moving equipment.

'52 WOOD #42 self propelled asphalt road mixer — used only 22 miles. WOOD PREPARIZER. 2 Distributors, 1,400 and 1,000 gallon.

BUTLER PORTABLE CEMENT PLANT 250 barrel bin, 500 barrel cement storage tank, very good. ERIE 3 compt 36 yard bin & scales — excellent.

7000′ steel road & curb forms, 6″ to 12″. TL-41, TL-25, WAYNE and P&H 1/2 & 3/4 yard drags & shovels —good.

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3 CAT #12 8T Series patrols, 2 CAT 9K #12's, ADAMS & A-W GRADERS. 4 105 compressors.

GALION 8-10 ton tandem roller, 2 yrs. old. 6 dd sheepfoot rollers. 6 pneu. rollers. LeT LS & FP good scrapers.

W-W 20-25 ton tandem good lowboy. Trucks and Truck Tractors.

B-G DITCHER & B-G LOADER. 2 FERG. tractors w/EVERETT ditchers.

Miscellaneous equipment, office equipment and many, many other pieces.

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CONTRACTOR

NEW YORK CITY, N. Y.
SATURDAY, APRIL 2nd

"An unusual lot of very fine equipment, much of which is current. All has been checked through H. O. Penn Machinery Co. shops."

TRACTORS: Cat D-8's, 2U, 8R & 1H series with Hyd & Cable Dozers; D-7 & D-6 Dozers; D-4's & D-2's most Dozers; TD-9's; Other Dozers & Loaders; Wheel Tractors.

RUBBER TIRED TRACTORS: DW-21's with Scrapers; Tournarockers: DW-10's with Wagons.

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GRADERS; SCRAPERS; PAVER; LOADER; SPREADERS; Many other items.

This sale is being held as another service to H. O. Penn Company customers & friends throughout the country.

H. O. PENN MACHINERY CO., INC.
OWNER
140th & East River, (Bronx)
New York City, New York

KANSAS CITY, MO.
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Good equipment, ready for the job, and all owned by Storms-Frew Construction Co.

COMBINATION CRANE, DRAGLINE, & SHOVEL MACHINES: NORTHWEST 80 D, S/N 12923, MURPHY ME-6 engine, very good; LIMA 602, CAT D-13000 engine; LINK BELT LS 85; Other attachments and buckets.

MOTOR SCRAPERS: 6 LA PLANTE CHOATE & ALLIS CHALMERS TS 300's, all w/BUDA 280 hp 6DAS engines, all good.

TRACTORS: 2 HD 20's; 4 D-8's, 3 w/dozers; other crawlers and wheel tractors.

PARSONS 310 Trencher, very good; PARSONS 21 Ditcher; 3 EUCLID end dumps; 15 ton, model 27FD; 2 LeT LP Scrapers; CAT 12 & 212 patrols; Sheepfoot rollers & pneumatic roller.

JOY 630 CFM COMPRESSOR, Model WK80, 1 year old, excellent. CP 315 and IR 105 Compressors; Wagon Drills; Welders; Pneumatic tools; Pickups & Trucks; Graco grease units; Much shop equip. and many other items.

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1 — 48" x 60" Traylor Bulldog Jaw Crusher (spare parts also)
2 — 20" Allis Chalmers Superior McCully Gyratory Crushers (spare parts also)
3 — Traylor No. 412 Type TZ Gyratory Crushers
2 — Traylor 8" Gyratory Crushers
2 — Traylor 48" Revolving Screens (spare parts also)
1 — New RCA Metal Detector 10" x 36" aperture
1 — New Ingersoll-Rand D6U Air Hoist
1 — Bucyrus-Erie 120-B Electric Shovel, now in operation (spare parts also)
1 — New Allis Chalmers 5' x 12' single deck low head vibrating screen, complete with sheaves for V belts
6 — Used single deck Robins Gyrex screens with bases
5 — Used single deck Robins Vibrex Screens
1 — Used Cameron pump, Size 10", 2400 G.P.M., 125' head, 1150 R.P.M., Left Hand, Serial No. 57537
1 — Used Cameron pump, Size 10", 2400 G.P.M., 125' head, 1150 R.P.M., Right Hand, Serial No. 57535
1 — New Edison Voice Writer (Dictaphone)

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Again! "Firstus Wid de Mostust"

Low Boy Trailers at Factory Prices

Sturdily built, superb workmanship, fully equipped. Many models to choose from. Come in! Compare these Galans with competitive makes. . . . Terms that will astonish you . . .

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"Diesel Injector Exchange Service" — "Service for Heavy Trucks"

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Caterpillar D-8, D-7, D-6, D-4, D-2, RD-8, RD-7, RD-6, R-5, 50.

International TD-18, TD-14, TD-9, TD-6.

Allis-Chalmers HD-14, HD-10, HD-7, Model L, S & K.

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Blades — For most all tractors, hydraulic and cable power control units, winches.

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Route 1 — Phone 28694
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1—9"x15" Champion Jaw Crusher.

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1—Telsmith Portable Plant — 10"x21" overhead eccentric Jaw Crusher, driven by 4 Cylinder Gasoline Engine, 20' Folding Elevator. Steel frame, wheels and draw bar.

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1—Allis-Chalmers 10" x 24" Roller Bearing Jaw Crusher; practically new.

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1—12" Enclosed Cent. Disc. Elevator, 78' centers with Motor. Heavy case.

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500—New 1¼" Crosby Cable Clamps.

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1—**Insley** K-12 Hoe, IND. Chrysler power, 18" x 9'-6 tracks. Overhauled. Good machine. Cleaned and painted.

1—**Insley** K-12 Dragline, Buda gasoline power, 9½' x 24" tracks.

1—**Insley** K-14 Dragline, 30' boom, high gantry, 24" x 11'-3 track. Chrysler power. This machine rebuilt. Excellent condition. Good buy.

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Koehring 205 dragline, ½ yd. serial #7068, year 1949, 45 ft. boom, 24" shoes, 11' 6" crawlers. Powered by U9 International. Price $6800.00.

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Two Lorain 80-Js, long booms, wide cats, Cat diesels, erection cranes.
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One Manitowoc 3900, long boom, Cummins Diesel, Torque Converter, Wide, Long Cats, Dragline.
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1 TL20 Lorain ½ yd. Combination shovel & clam, 1947 model $6,500.00
1 1948 P&H 655 Standard Shovel Front, Ser. 12669 ..... $18,000.00
1 Hardsogg Hort. Drill, new type 6 in. auger mtd. on 4x4 army truck. ..$2,000.00
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1	Gardner Denver Jack Hammer	1/1/54	400.00	275.00
1	Gardner Denver Paving Breaker	1/1/54	370.00	250.00
1	Ther Clay Spade	1/1/54	200.00	125.00
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1	Aeroil Lead Furnace	4/13/51	175.00	75.00
1	Master Elec Vibrator & Grinder	8/27/51	400.00	170.00
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1	1 C.Y. Insley Concrete Bucket — Side Discharge	8/8/53	365.00	275.00
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Caterpillar Scraper Model 80
3—Caterpillar DW 10's
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Buckeye-Model 70-Dragline, 28" wide track — 30' boom with 10' extension — backhoe with 42" dipper — Hendrix ¾ cu. yd. drag bucket — Chrysler gas powered. Good condition. Located Rapid City.

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1—Rex 200 Single Pumpcrete.
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Koehring #34 E. Dual Drum Paver #19910.
Lima #34 Paymaster Crane, Dragline #4831.
Lorain L-50 Crane, Dragline #20440.
Cat. #12 Grader #8T 1331.
Cat. #12 Grader #8T 3027.
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Hopkins Low Pressure Burners.
Butler 250 Bbl. Cement Bin Complete.

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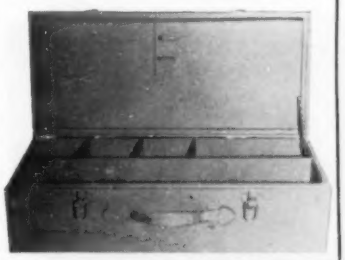

21″ long, 9½″ wide and 6″ deep, with two snap locks and leather handle. Price each $1.50; lots of 10-25, $1.35; over 25, $1.25.

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2 — 100 HP Lucey portable horiz. firebox boilers. 200 lbs. Oil fired. ASME Code.
2 — Jaeger 3-drum Hoists, 100 H.P. Continental Gas Engine 10,000# SLP. NEW.
1¼ yard Manitowoc 2000-B crane, Cat D13000 eng. 70′ boom.
25 ton Orton Locomotive Crane. Cat Diesel. New 1942. Air Controls.

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36″ Kue Ken Gyracone — 10B & 13B Telsmith — 36″ & 29″ Sup. McCully — 7½K, 8K, 9K Gates A-C — 3042, 3648, 4042, 4248, 4860, 8466 jaws — 2416, 3016, 4022, 2454 rolls — 5½′x22′. Marcy #86, 5x10, 5x14, 6x12, 10x4 rod & ball mills — Smidth 16B tube mills — 15 & 22 ton Euclids — 42T & 25T blast hole drills — 50 ton ore cars — 85 ton trolley locomotives — Lima 1201 — N.W. 6, 80D, 95 — 7W, 9W, 200W Monighan — Manitowoc 3500 & 4500 — Page 618 & 620 — P&H 1600 — Marion 111 — B. E. 120B, 54D, 175B, 51B — 820 Lorain — P&H 1055 — 7x110, 10x120 kilns.

Crushing plants — rod, ball & hammer mills — gyratories — 2′, 3′, 4′ Symons — roll & jaw crushers — screw, rake & bowl classifiers — compressors — converters — conveyors — drills — dump cars — motors — feeders — generators — hoists — kilns & dryers — pumps — locomotives — shovels & draglines — screens — transformers.

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. . . for more details circle 179, page 16

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Trailer-mounted ONAN "CW" Electric Plant

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For floodlighting, operating electric tools, emergency standby use.

Goes Anywhere!

Here's real mobility in high-capacity electric plants. You can tow a trailer-mounted Onan "CW" as fast as a car will travel . . . anywhere a tractor can go. Fully-protected by heavy-gauge steel housing; stays on the job in any weather.

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WIDE RANGE OF ACCESSORIES

You can equip your "CW" Electric Plant for any type of portable service. Accessories include skid, battery rack, 9-gallon fuel tank, weather-proof housing, two-wheel trailer, or 4-wheel rubber-tired dolly. *Put one of these portable, high-capacity units on your job now!*

Write for Folder A-362

D. W. ONAN & SONS, INC.

3447 Univ. Ave. S. E., Minneapolis 14, Minn.

. . . for more details circle 215, page 16

Manufacturers' Literature

(Continued from page 122)

Safety Beam Guard Rail

The advantages of Bethlehem safety beam guard rail are set forth in Booklet 380 issued by Bethlehem Steel Co., Publications Department, Bethlehem, Pa.

Illustrated with photographs, charts and diagrams, the booklet gives a picture story of how safety beam guard rail is used to provide protection to motorists and other highway travelers. Standard details and assembly plans for guard rail to meet every conceivable condition are shown with drawings, tables of dimensions and mechanical properties, etc.

For more information circle 139 on Service Coupon Page 16 and mail now.

Large Volume Concrete Mixers

A 16-page catalog describing mechanical and application pictures of its line of modern volume production concrete mixers has been issued by Koehring Co., Milwaukee 16, Wis. These mixers are in the 1 to 4 cu. yd. capacity category. Both the tilting and non-tilting types of construction mixers are discussed in the new catalog. A breakdown of the structural features of each type mixer is included along with a liberal amount of plant pictures showing actual mixer installations at commercial and construction projects. Koehring produces the non-tilt construction type in 1, 2 and 3 cu. yd. sizes; the tilting concentric zone type in 2 and 4 cu. yd. sizes.

For more information circle 140 on Service Coupon Page 16 and mail now.

Forward-Mounted Telescopic Hoists

A new 2-color catalog (LL-103) descriptive of Galion Allsteel Duo-scopic hoists, Models 55381 and 66381, has been announced by The Galion Allsteel Body Co., Galion, O. This 4-page catalog describes construction details and design features of Galion's new line of forward-mounted telescopic hoists. Illustrations include action photos and line drawings of the new hoist plus cutaway views of the Duo-scopic hoist cylinder and roller bearing hydraulic pump. Exclusive advantages of Galion design and construction are stressed. Condensed specifications are also included.

For more information circle 141 on Service Coupon Page 16 and mail now.

Concrete Truck Mixers

A new bulletin (1260-B1) on concrete truck mixers issued by Worthington Corporation, Harrison, N. J., presents complete information on their LC and LO models. Descriptive data are given on component parts such as, transmissions, clutches, brakes, drum rollers and drive, drum head and blades, along with graphically illustrated diagrams and pictures of 3½, 4½, 5½ and 6½ cu. yd. Hi-Up mixers. Additional information is furnished on large central concrete mixers for pre-mixing operations.

For more information circle 142 on Service Coupon Page 16 and mail now.

Diesel Engines

A new brochure describing the operation of General Motors "6-110" diesel engines and illustrating industrial and marine models in the series from 200 to 575 HP is ready for distribution by Detroit Diesel Engine Division, Detroit 28, Mich.

Entitled Power for Progress, the brochure covers features of design, specifications and power curves of single-, multiple-engine and torque converter units and includes photos of these engines at work in various types of equipment.

For more information circle 143 on Service Coupon Page 16 and mail now.

Traffic Signs

A new traffic sign catalogue, picturing overall reflectorized signs surfaced with "Scotchlite" brand reflective sheeting and backed with aluminum is available from Minnesota Mining and Manufacturing Co., 900 Fauquier St., St. Paul 6, Minn. The 12-page booklet emphasizes durability and 24-hour visibility through the combination of aluminum and wide-angle "Flat-top" reflective sheeting. The result is a sign described as having night and day visibility, all-weather performance, and requiring minimum maintenance. Pictured in the catalogue are regulatory, warning and guide signs, bridge-end markers, delineators, railroad crossing signs and others.

Changes in the new catalogue include a 20 per cent price reduction on reflective delineators; addition of several legends in the warning sign series; new extruding aluminum crossbucks for railroad crossing signs; addition of 18-in. and 36-in red stop signs; and posts, bolts and straps for sign mounts.

For more information circle 144 on Service Coupon Page 16 and mail now.

Pettibone Speed Swing Loader

Interesting case histories of how the Pettibone speed swing loader is helping to solve loading problems for contractors, municipalities, public utilities and general manufacturing plants are outlined in "Modern Methods," the first issue of a new 12-page, illustrated monthly magazine released by Pettibone Mulliken Corporation, 4700 West Division St., Chicago, Ill. In addition, the magazine presents the complete story behind the original design of the speed swing and relates how it was developed as a multi-purpose, highly versatile piece of equipment, with the needs of all types of users in mind. Hence, the development of a loader incorporating a 180-degree swing.

For more information circle 145 on Service Coupon Page 16 and mail now.

Handling Quarry Stone With Lift Truck

A new Field Report, No. 54, on the handling of heavy loads of stone in a southern granite quarry with the Qn-20 lift truck, has been issued by Hyster Co., P.O. Box 4318, Portland 8, Ore. Prepared in the field by Hyster engineers, the illustrated report is an actual case history of the application of Hyster equipment.

For more information circle 146 on Service Coupon Page 16 and mail now.

In purchasing this 100 ton transformer The Consumer Power Company of Flint, Michigan, showed faith in the Westinghouse slogan "You Can Be SURE If Its Westinghouse."

In placing a large percentage of this load on one of their Rogers Trailers, P. Van Harren & Sons of Bay City, Michigan, again displayed their faith in the rugged dependability and braking reliability of these trailers.

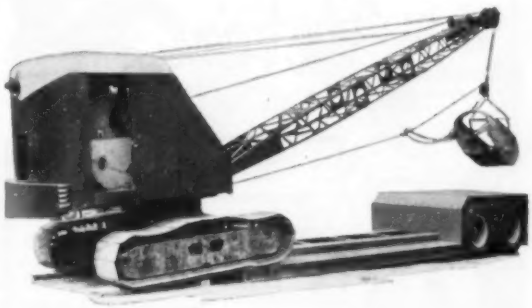
This transformer, the heaviest load ever moved over Flint Streets, measured 20′ x 15′ x 10′. The move was made under the supervision of Venus and Russell Van Harren with Jacob Smith as rigger foreman.

You, too, can place the utmost confidence in Rogers Trailers, regardless of the type needed or the difficult nature of the loads it will be required to haul.

EXPERIENCE builds 'em

ROGERS HEAVY DUTY Gooseneck Trailers

PERFORMANCE sells 'em



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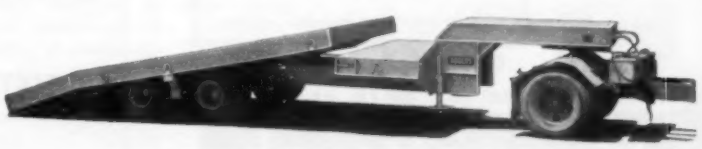
Export Office: 50 Church St., New York 7, N.Y., U. S. A. — Cable Address: Brosites



Divided bed, tilt deck trailer with gooseneck.

. . . for more details circle 221, page 16

With the Manufacturers and Distributors

CONTINENTAL COPPER ACQUIRES WOOLDRIDGE. Wooldridge Manufacturing Co., Sunnyvale, Calif., has been purchased by Continental Copper & Steel Industries, Inc., New York, N.Y. H. J. Gusman, founder and president of Wooldridge, is now vice-president of Continental and is in charge of the Wooldridge Division.

WENTWORTH APPOINTED CENTRAL REGION SALES MANAGER. Clarence S. Wentworth, manager of Detroit District offices of Worthington Corporation, Harrison, N. J., has been appointed Central Region sales manager. He succeeds William A. Meiter promoted to general sales manager.

GALION ALLSTEEL BODY CO. NAMES NEW REGIONAL MANAGER. Frank L. Hamilton has been appointed regional manager in charge of the Michigan, Ohio, western Pennsylvania, Kentucky and West Virginia territory of the Galion Allsteel Body. Mr. Hamilton was formerly affiliated with the H. S. Watson Co., Oakland, Calif. With headquarters in Toledo, Ohio, Mr. Hamilton will supervise sales of Galion Allsteel dump bodies and hydraulic hoists of 3 to 27 ton capacities, Galion Load-evator rear end truck loaders and Galion E-Z pack refuse collection bodies.

AUSTIN DIVISION HAS NEW WESTERN SALES MANAGER. Floyd Baker has been appointed western regional sales manager of the Austin division, Central Ohio Steel Products, Galion, Ohio. Mr. Baker is responsible for sales of Austin Overshot Loaders in the states west of the Mississippi, with headquarters at 2 Santa Fe Drive, Denver, Colo. Before joining the Austin division as a sales engineer 18 months ago, he was an independent contractor specializing in dam, highway and large building construction.

GM DIESEL APPOINTS NEW WISCONSIN DISTRIBUTOR. Cunningham-Ortmayer Co., 2016 West Cornell St., Milwaukee, Wisc., has been appointed distributors of General Motors diesel engines throughout the state of Wisconsin.

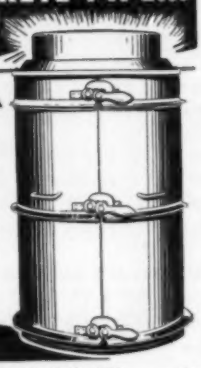
PETERSON ELECTED PRESIDENT OF MACK TRUCKS, INC. P. O. Peterson has been elected president and chief executive of Mack Trucks, Inc., New York, N.Y. E. D. Bransome, until now president and chairman of the board, will continue as chairman. Mr. Peterson comes to Mack from his position as executive vice-president of Studebaker-Packard Corporation, South Bend, Ind.

RUSSELL APPOINTED JOY ENGINEERING V.-P. John D. Russell, formerly manager of engineering, Joy Manufacturing Co., Pittsburgh, Pa., has been appointed vice-president, engineering of the company, with headquarters in Pittsburgh.

LEROI NAMES SULLIVAN ASST. SALES MANAGER. Paul D. Sullivan has been appointed assistant sales manager of LeRoi Division, Westinghouse Air Brake Co., Milwaukee, Wis. He will be concerned primarily with promoting sales of LeRoi portable air compressors and Westinghouse Stationary air compressors.

FOR THE FINEST CONCRETE PIPE... YOU NEED FINEST FORMS!

THE Quinn Standard



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For making pipe by hand methods by either the wet or semi-dry process. Sizes for pipe from 10" to 120" and larger. Tongue and groove or bell end pipe in any length desired.

WRITE TODAY for complete information and estimates.

Also manufacturers of QUINN CONCRETE PIPE MACHINES

Quinn WIRE & IRON WORKS BOONE, IOWA

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the charm and gentle color of the Blue Horizon . . . luxurious . . . spacious . . . yet quietly hospitable with a warm friendliness that betokens congeniality . . . this is your tropic oasis! From the serene dignity of the attractive lobby, to the sun-splashed terrace gardens, the Blue Horizon offers every delight for your most enjoyable vacation.

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CUMMINS APPOINTS JUNG REGIONAL MANAGER. J. P. Jung, formerly assistant regional manager at Los Angeles, Calif., for Cummins Engine Co., Inc., Columbus, Ind., has been appointed regional manager, southeastern region, with headquarters at 805 Peach St., N. E., Atlanta, Ga. He replaces R. P. Parshall who has moved to Milwaukee to take over the Cummins distributorship as president of Cummins Diesel of Wisconsin, Inc.

HOWELL APPOINTED DISTRIBUTOR FOR 3 COMPANIES. Howell Tractor & Equipment Co., 7443 S. Racine Ave., Chicago, Ill., has been appointed northern Illinois and northwestern Indiana distributor for International Harvester Co., earthmoving and industrial power products, J. D. Adams Manuacturing Co., motor graders and Traveloaders; and F. G. Hough Co., Payloaders. The territory covers 17 counties in northern Illinois and Lake, Porter and LaPorte counties in Indiana. The Howell Co. plans considerable expansion in both personnel and plant facilities.

RATKOWSKI APPOINTED DIVISION MANAGER. The American Manganese Steel Division of American Brake Shoe Co. has appointed Thomas A. Ratkowski as division manager for engineering and development. Formerly a sales engineer, Mr. Ratkowski joined Brake Shoe in 1922 as a draftsman and has held various engineering capacities in the division. He will be at the division headquarters in Chicago Heights, Ill.

NEW BUCYRUS-ERIE DISTRIBUTOR. Euclid-Tennessee, Inc., 720 Murfreesboro Road, Nashville, Tenn., has been appointed distributor by Bucyrus-Erie Co., South Milwaukee, Wis. for its excavators and cranes in central Tennessee.

NEW LIMA DISTRIBUTOR. Baldwin-Lima-Hamilton Corporation, Construction Equipment Division, Lima, O., has announced the appointment of Kentucky Equipment Co., Inc., 3611 St. Germaine Court, Louisville, Ky. as distributor for Lima shovels, cranes, draglines and pull shovels for the entire state of Kentucky with the exception of the three extreme northern counties and three southeastern counties.

GEIGER OF AIR REDUCTION RETIRES. L. O. Geiger, manager of the Dayton, O., district of Air Reduction Sales Co., New York, N.Y. has retired. He had been with the company for 38 years. He is succeeded by C. R. Grange, formerly assistant district manager.

MCKINLEY NAMED FIELD SERVICE MANAGER. Russell L. McKinley has been appointed field service manager of Construction Machinery Division of Clark Equipment Co., Benton Harbor, Mich. He was formerly service manager of Browning Crane & Shovel Co., Cleveland, Ohio.

MARMON-HERRINGTON PROMOTES RAY. Edward F. Ray, formerly assistant sales manager of All-Wheel-Drive Truck Division of Marmon-Herrington Co., Inc., Indianapolis, Ind., has been appointed general sales manager for the division.

GAR WOOD APPOINTMENT. Gar Wood Industries, Inc., Wayne Mich., has appointed Leo M. Brown assistant to the director of sales and advertising.

NEW DISTRICT REPRESENTATIVES. Ben E. Lingenfelter, Salt Lake City, Utah, has been appointed western district representative for Buffalo-Springfield Roller Co., Springfield, O., in states west of the Mississippi. Charles W. "Mark" Anthony has been appointed eastern district representative for all states east of the Mississippi.

CUMMINS ENGINE APPOINTMENTS. W. M. Brooks has been appointed regional manager, Midwest District, Central Region by Cummins Engine Co., Inc., Columbus, Ind. His headquarters are at 700 Shell Bldg., 1221 Locust St., St. Louis, Mo. H. A. Strohman, assistant regional manager, Eastern Region, has been transferred from New York City to the new Middle-Atlantic office at Harrisburg, Pa.

LESCHEN MOVES LOS ANGELES OFFICE. Leschen Wire Rope Division of H. K. Porter Co., Inc., has moved to 6424 East Fleet St., Los Angeles. The new location will house both the warehouse and sales office.

NEW EUCLID DEALER IN IOWA. James W. Bell Co., Inc., 1720 I Ave., N. E. Cedar Rapids, Ia., has been appointed by Euclid Division, General Motors Corporation, as Euclid dealer for state of Iowa except the counties of Woodbury, Monona, Crawford, Harrison, Shelby, Pottawattamie, Montgomery, Fremont and Page.

NINE NEW DEALERS TO HANDLE MICHIGAN LINE. Nine new dealers have been appointed to sell and service the Michigan line of excavator cranes and tractor shovels, products of the Construction Machinery Division of Clark Equipment Co., Benton Harbor, Mich. Appointed to handle both Michigan lines are Pressed Steel Car Co., New York City, for the territory of Hawaii; Jackson Machinery Co., Inc., New Orleans, for the entire state of Louisiana; Contractors Service, Inc., Charlotte, for the entire state of North Carolina; Spreitzer, Inc., Cedar Rapids, for eastern Iowa; J. J. Turner, Inc., Cleveland, for eastern Ohio; and J. C. George Construction Equipment, Inc., Syracuse, for upper central New York. Cunningham-Ortmayer Co., Milwaukee, Wisc., has had its territory enlarged to include the Upper Peninsula of Michigan. Appointed to handle only Michigan tractor shovels are Midwest Equipment Co., Fargo, for eastern North Dakota and northwestern Minnesota, and Midwest Equipment Co., Bismarck, for western North Dakota and northeastern Montana. Appointed only to handle Michigan excavator cranes is Field Machinery Co., Cambridge, for eastern Massachusetts.

HOMELITE PROMOTES TWO. J. A. Abbott, president of Homelite Corporation, Port Chester, N. Y., has announced the election of Richard C. McDonald as vice president in charge of manufacturing and Albert K. Newman as vice president in charge of engineering.

Goldblatt

"fresno" concrete trowel

$11.50

f.o.b. Kansas City, Mo.

1056 tools

FREE TOOL CATALOG—1,056 tools for trowel trades. 100-page illustrated book. Send name on postcard.

Exceptionally fine quality single-action "Fresno" trowel. Preserves balance despite roughest use. Tempered, ground and polished spring-steel blade is permanently riveted to sturdy aluminum mounting. Includes 6-ft. Ash handle with heavy steel ferrule. Fully adjustable. 30"x5" trowel size, order No. 30-SA. Check, money order or C.O.D. Fully guaranteed.

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1930 Walnut, Kansas City 8, Mo.

. . . for more details circle 191, page 16

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DIETZ TUBULAR LANTERNS

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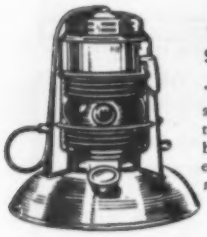

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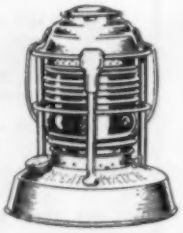
A miniature beacon—with new "Pencil Beam"—visible from any direction, near and far. Longest burning—over 100 hours on a pint of kerosene.



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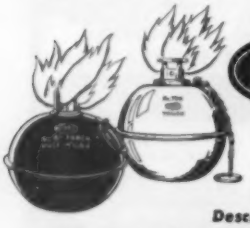

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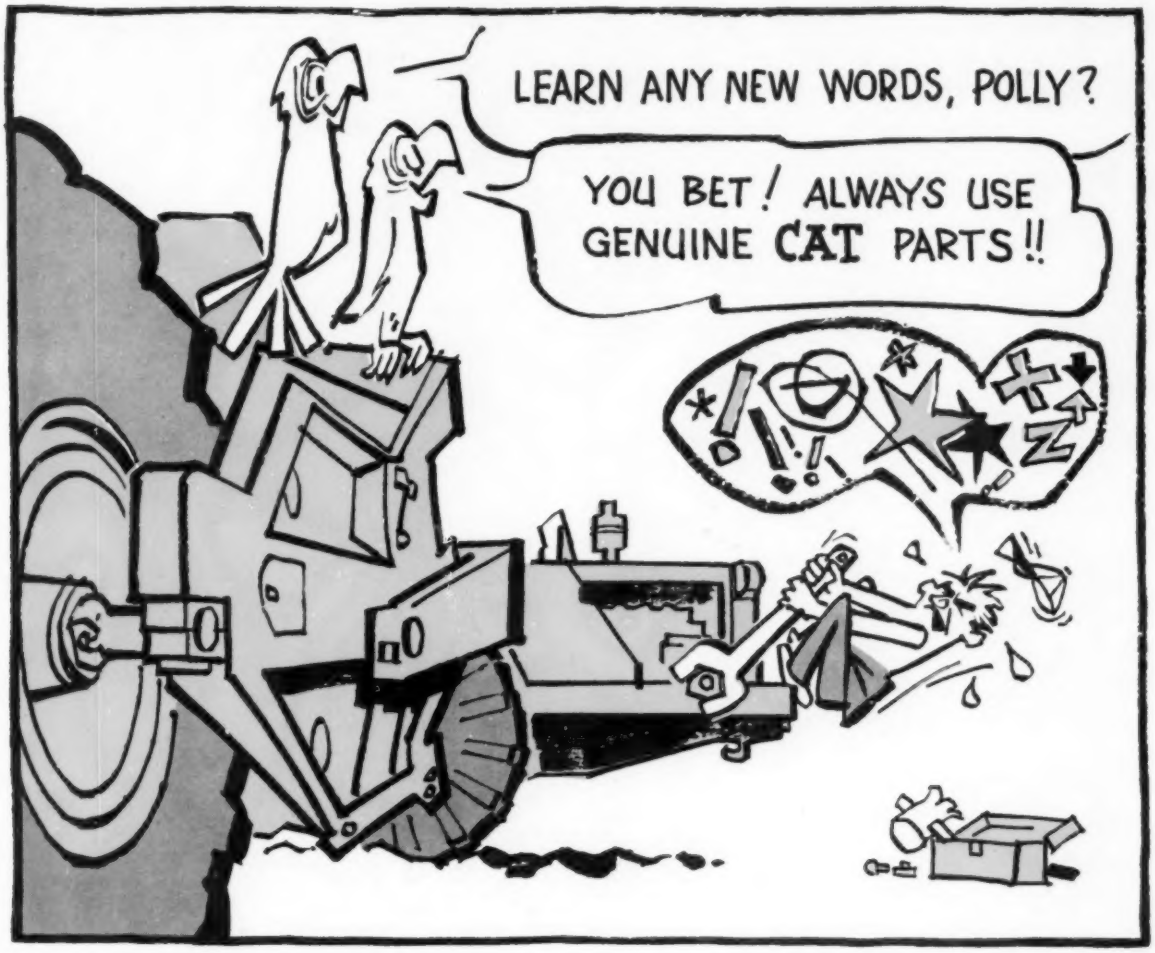

Down time sure brings out the classiest words in a man's vocabulary. Best way to avoid it is to insist on genuine CAT* parts every time. Then you're sure of getting parts that are made to the latest design, precisely manufactured of the right materials, rigidly inspected and tested.

Take the parts in the engine's heat zone, for example.

Different makes of liners, pistons and rings look a lot alike. But Cat cylinder liners are "wet type" design, made of hardened alloy iron with inner surfaces "Hi-Electro" hardened. Genuine Cat pistons are made of one-piece aluminum alloy castings, with a cast-iron band bonded into the top to form the hard-service top ring groove. And that top ring—if it's genuine Caterpillar—is heavily chrome-faced. Each Cat ring is individually cast from specially alloyed iron. With substitute parts: who can be sure?

The difference on the job: Caterpillar-built parts in your engine's heat zone give you new-machine performance, shorter break-in time, longer life and the true economy of reduced repair costs and uninterrupted production. With substitute parts: who can be sure?

Better get genuine Caterpillar parts every time.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

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For Virginia's main truck route . . .

Laying the 1½ inch Texaco Sand Asphalt wearing surface over 5½ inch base of same type during construction of new traffic lane for US-301 in Virginia

. . . this 7-inch Texaco Sand Asphalt pavement

No longer adequate for today's traffic this existing section of US-301 will serve one-way traffic when new Texaco-paved lane is completed.

Contractor — ADAMS CONSTRUCTION COMPANY, Roanoke, Va.

Most of the heavy truck traffic moving north and south through Virginia uses U. S. Route 301. To cope with its ever-increasing volume of traffic, the State gradually is converting US-301 into a dual highway.

The accompanying photographs show the construction of a new lane which parallels the existing route south of Petersburg. Plant-mixed Texaco Sand Asphalt was used for both base and wearing surface in this project. The base, 5½ inches thick, was constructed in three courses, on which the surface was laid to a thickness of 1½ inches. An 8-inch sand-clay sub-base supports the Texaco Sand Asphalt pavement.

Virginia put the emphasis on flexibility in constructing this new section of US-301. Flexible, resilient, shock-absorbing highways like this one are the most effective answer to today's heavy traffic. They withstand impact longer, hold maintenance costs down to a minimum and have a lower first cost than other highways with the same load-carrying capacity.

Helpful information about Sand Asphalt, as well as other road and street types constructed with Texaco Asphalt Cements, Cutback Asphalts and Slow-curing Asphaltic Oils, is available in two booklets, which can be secured without obligation by writing our nearest office.

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